Instrumentation Scientifique de Laboratoire

User's Manual of the MPP 5Gs with sample changer

Instrumentation Scientifique de Laboratoire - BP 70285 - 14653 CARPIQUET CEDEX FRANCE
Phone : (+33) 2.31.26.43.00 Fax : (+33) 2.31.26.62.93 WebSite: http://www.isl-france.com

Historical Review

Revision index	§ concerned	Modification descriptive	Date
A		Original issue	06/04/04
B	Part 1 § 4.3.3	Alan available	02/09/04
	Part 2 § 2.5.3	Visualization of sample test results in the changer	
	Part 3 § 3.1	Modification of the product parameters of the run environment	
	Part 3 § 4.1	Updating of result data	
	Part 3 § 6.4.16	Addition of the alarm: “Leak Detected, Check the sample”	
	Part 3 § 7.3	Setting of warning alarm duration	
	Part 4 § 4.4	Modification of the data transfer procedure	
	Appendix A	Updating of printing examples	
	Appendix C	Updating of test launch diagram	
C	Part 1 § 2.2	Updating of standard methods	24/11/05
	Part 1 § 2.3.2	Updating of MPP 5Gs benefits and features	
	Part 1 § 4.1	Addition of a warning on storage temperature	
	Part 1 § 5.3 Part 2 § 2.1	Addition of a notice on test tubes: unique usage	
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	Part 3 § 3.1	Modification of the test product setup menu: Addition of the cooling rate selection parameter	
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	Part 4 § 1.2	Screen 1: Updating of screen data Screen 3: Description of the automatic enslavement procedure of the optical detector	
	Part 4 Chapter 5	Addition of chapter 5: “Analyzer Maintenance”	
	Part 4 Chapter 6	Addition of chapter 6 “Troubleshooting Guide”	
	Appendix A § 1.1	Result printing: Addition of cooling rate	
	Appendix A § 2	Test parameter printing: Addition of cooling rate	
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	Appendix B § 5.4	Updating of the test product example message and message field: Addition of “Mode” parameter (for cooling)	

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CUSTOMER REPORT

Reserved for public relations department
N° .....
Date .....

PURPOSE

I wish to
- ☐ Report an error
- ☐ Submit a suggestion / a comment
- ☐ Get more information

In the area of ☐ Hardware ☐ Software ☐ Manual

ANALYZER ENVIRONMENT (please be complete)

• HARDWARE Type of Analyzer: MPP 5G
Serial N° : .....

Options :
- ☐ Parallel printer
- ☐ Graphic printer
- ☐ Plotter
- ☐ RS232Cinterface
- ☐ Current loop interface
- ☐ Other : .....

• SOFTWARE Version : .....

ATTACHED SHEETS

☐ Listing ☐ Diskette ☐ Drawing ☐ Text ☐ Other

PROBLEM DESCRIPTION / COMMENTS

_____

_____

_____

_____

_____

_____

SUBMITTED BY

Name :
Company :
Address :
Phone : Fax : Date:

Send this report to your local Sales office or to

Groupe ISL - Service Clients
BP 70285
14653 CARPIQUET CEDEX FRANCE

Phone : (+33) 2.31.26.43.00 – Monday through Friday from 9 :00 a.m. to 5 :00 p.m. French Time
Fax : (+33) 2.31.26.62.93
Web Site: www.isl-france.com

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Caution

This ISL Analyzer has been carefully designed, manufactured and inspected for quality. It has been equipped with a number of safety features.

However, the use of this Analyzer may involve the handling of solvents, chemicals, and other potentially dangerous flammable, toxic, etc.) materials. Please exercise caution when- handling these materials while operating the Analyzer.

Please:

- *read the manual*
- *wear proper protective clothing*
- *perform all suggested service procedures*
- *use care to prevent accidents.*

The manufacturer accepts no responsibility for any damage or liability arising from the use of Analyzers.

Use of Non-ISL Products and Accessories. Defects or damage that result from the use of Non-ISL branded or certified Products, Accessories, Software or other peripheral equipment are excluded from warranty.

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Part 1 General

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1.Introduction

1.1.ISL company profile

We would like to take this opportunity to thank you for choosing ISL product. We are confident that you will be completely satisfied with your new Analyzer and we hope that you continue to call on us for all of your laboratory's petroleum testing needs. Before you begin, we ask you to take a few minutes to become acquainted with ISL and its history.

ISL's beginnings go back to 1975, when a group of engineers and scientists from the heart of the Northern France's petrochemical industry began seeking ways to automate petroleum testing. The neighboring industry served as an excellent research and development proving ground for their new equipment.

By the end of 70's, several quality instruments had been developed and were being marketed in Europe under ATPEM Trademark.

The most famous of these new instruments was the CPP 97, Automatic Cloud and Pour Point Analyzer. Introduced in the early 1980's, its successor, the CPP97-6, revolutionized cold flow testing enabling up to six tests automatically and simultaneously.

Adding new automatic instruments each year, ATPEM soon became a worldwide leader in automatic petroleum test instrumentation. In 1986, they expanded operations, reorganizing into the company now knows as ISL.

Striving to maintain close contact with customers in over 75 countries, ISL has since grown, founded Sales & Service branches on each continent. With design, marketing, service and support operating together under the ISL roof, the company reached "a new dimension" in 1993 by obtaining ISO 9002 certification from the BVQI. Working hard to extend our quality assurance program, we received ISO 9001 certification in 1995.

Though best known for distillation, viscosity testing, cold behavior instrumentation, flash point, evaporation loss, oxidation, and asphalt testing equipment, ISL's contributions to automated petroleum testing continue to grow. With more than 10 patents to date, ISL's constant research into new technologies buttresses our precedent for ultimate precision, performance and safety. The company now offers over 20 Automatic Analyzers for different applications giving incontestable benefits to its users in increasing of test precision by elimination of operator subjectivity and human errors, while increasing productivity and reduce operator time with highest level of safety.

A worldwide distribution network supports our customers with quick, efficient service, and our highly knowledgeable service staff buttresses this relationship, providing solutions to product or application challenges.

Please visit our web site for more information: http://www.isl-france.com .

1.2.About this manual

This manual is made up of four main parts, entitled:

- Part I: General
- Part II: Using the MPP 5Gs with prestored products
- Part III: Advanced use of the MPP 5Gs
- Part IV: MPP 5Gs Maintenance

The first part presents the analyzer and this manual content.

The second part allows the operator to carry out an initial determination test of the cloud point and the pour point with the MPP 5Gs, in a few steps, confidently and with no particular prior knowledge.

The third part, on the other hand, makes it possible to use the MPP 5Gs potential to the full. It is, therefore, intended rather for the knowledgeable user who is familiar with tests for determining cloud and pour points. In any case, the sensitive parts of the MPP 5Gs software, those linked to the run parameters, can be read- and write-protected by a system of passwords chosen by the user.

The fourth part, intended for service staff, explains in detail maintenance and upgrade operations of the analyzer.

1.3.Typographical conventions

Convention	Meaning
Bold	Important words or phrases
Bold Italics	Menus or buttons on the LCD
Bold + SMALL CAPITALS	Keys on the front panel of the analyzer

1.4.Meaning of symbols

	Note	***Important comment.***
	CAUTION !	***Call for particular care.***
	Referral	***Referral to a particular document (Standards) or to another manual.***

2.Analyzer features

With the MPP 5Gs, ISL has once again developed a user-friendly and ergonomically attractive petroleum product analyzer. Our regular customers will recognize the ISL experience and reliability combined with the now established mark of the new generation of ISL Analyzers.

The analyzer you have just acquired has been born of a combination of customer feedback and over 20 years of experience in the design and manufacturing of petroleum products Analyzers.

2.1.MPP 5Gs presentation

Backed by leading the highest quality design, the MPP 5Gs analyzer has been designed to determine precisely cloud and pour characteristics of petroleum product during cooling. These characteristics allow hydrocarbons behavior to be determined when cooling, having an important effect on their performance and safety.

The distinctive feature of this instrument is its versatility, as its setup is fully adjustable. It is designed to run programs based on customized sets of parameters selected to suit users' requirements. This major advantage makes the instrument suitable not only for conventional testing, but also for R & D work. Further, versatility has not been achieved to the detriment of operating convenience. As will be seen in the next chapters, the instrument is just as easy to operate as it is versatile.

This compact, exceptionally user-friendly unit proves ideal for applications where standard laboratory instrumentation cannot be applied or is restricted due to insufficient response time, small sample volume availability, dimension/weight limitations, or untrained staff with little exposure to lab equipment. This rugged, fully independent, stand-alone unit enables installation at locations ideal to workflow, making it an additionally ideal tool for process quality follow-up (at-line), mobile applications or in the realms of research.

The MPP 5Gs combines a patented built-in cooling system and a highly precise detection mechanism into an ultra-compact, easy to use instrument that’s ready to work whenever and wherever you are.

Straightforward operation involves simply placing a vial filled with test specimen in the sample changer and pressing the **OK** key. No special programming of test conditions or prior cloud and pour point measuring test knowledge is required. Entering the expected cloud or pour point is optional.

The unit automatically controls cooling and heating of specimen. Optical detectors monitor appearance and disappearance of hydrocarbon crystals. The instrument employs the power of automation to significantly increase test productivity while also improving repeatability and reproducibility: the MPP 5Gs provides a simultaneous cloud and pour run using only *0,5 ml of sample* following by a test report (result in 20 minutes for example for a pour point test at –30°C). Further, the sample changer featuring the MPP 5Gs will allow you to program up to 10 tests.

An alphanumeric solvent-proof keypad and the LCD display provide a user-friendly interface.

ISL has taken great care with the design and manufacture of this analyzer and hopes it will give you every satisfaction.

2.2.MPP 5Gs product overview

ISL's fully automatic MPP 5Gs has been designed to determine quickly and precisely cloud and pour characteristics in connection with most hydrocarbons (lubricating oils, base stock oils, PAO, distillate fuels, liquid petroleum products, biodiese) enhanced optical and differential pressure detection down to –95°C with 0,1°C resolution: ship and land-based Diesel engine fuels, power generation fuels, lubricants, white oils, etc….

The analyzer determines the no-flow point of the product tested, the pour point and the cloud point, and if it is programmed, the non-rounded temperature of the cloud point.

By definition, the no-flow point of a product is the precise temperature of a test specimen at which a wax crystal structure or viscosity increase, or both, impedes movement of the surface of the test specimen under the condition of the test.

The pour point is the lowest temperature at which the product continues to flow when it is cooling without stirring.

As for the cloud point, it is the temperature at which the paraffin-base constituents of a product may precipitate when cooling, a reaction which may cause filter clogging problems.

These information are particularly relevant to the storage of products, which must be pumped out afterwards because of pipework clogging problems or to report problems of downgrading of performance in the case of oils.

According to the test parameters programmed: test frequency and cloud point temperature rounded, results obtained with the MPP 5Gs are perfectly correlated to the following standard test methods:

- For pour point determination, the ASTM D97 standard test method and its equivalencies: ASTM D5950, ISO 3016, DIN ISO 3016, IP 15, JIS K2269 and NF T60-105.
- For cloud point determination, the ASTM D2500 standard test method and its equivalencies: ASTM D5771, ASTM D5772, ISO 3015, IP 219, IP 444, IP 445, JIS K2269 and NF T 60-105.

2.3.Technical specifications

2.3.1. Benefits and features

- Accurately determines the cloud and pour point of most hydrocarbons (lubricating oils, base stock oils, PAO, distillate fuels, liquid petroleum products, biodiesel) by enhanced optical and differential pressure detection
- Sample preheating up to +60°C (140°F) before the test starting
- Direct specimen temperature control
  - Measuring instrument: Pt 100 IEC 751 probe – class A
  - Resolution : +/-0.1°C
  - Stability: +/-0.5°C
- Includes alphanumeric keypad with easy to read LCD screen
- 10 Specimen sample changer
- Built-in cooling system
- Up to 99 results in memory; unlimited storage with PC
- Real time displaying and printing of test results
- Multi-level password protection ensures only authorized changes
- Automatic temperature calibration routine
- 20 point temperature probe correction table
- Programmable calibration frequency
- Alarms pertaining to system failure and warning
- Serial ports: RS232C/RS485 for remote workstation
- 24-bit high-resolution A to D converter

2.3.2. Operation conditions

- Ambient operating temperatures : 15°C to 35°C (59°F to 95°F)
- Temperatures range: –95°C to +45°C (-139°F to 113°F)
- Storage: -20°C to 40°C (-4°F to 104°F)

2.3.3. Power supply

- Mains power supply: 90/240 VAC, 50/60 Hz
- Maximal wattage: 200 W

2.3.4. Dimensions

- Dimensions: 250 mm (l) x 650 mm (L) x 310 mm (H)
- Weight: 28 Kg

3.Care in use

3.1.Care in the use of testing and cleaning equipment

It is supposed that operators are familiar with the handling of hydrocarbon products and that they are thus aware of the dangers and risks that attach to them.

3.2.Precautions to take when using built-in cooling Analyzers

Built-in cooling analyzers comprise a cooling compressor that necessitates several special precautions to be respected for the long life of the analyzer and its optimum performance:

- Avoid using the analyzer on a vibrating surface. Surface vibrations can enter into resonance with those of the compressor and cause damage to the analyzer.
- The optimal operating temperature for the analyzer is around 20°C. To avoid harmful overheating of the unit:
  1. Keep the rear of the unit clear to allow heat to escape easily.
  2. Keep the ventilation holes in the side of the unit clear. They must be regularly blown clear of dust to avoid clogging and possible blocking.

4.Unpacking and installation

4.1.Care in unpacking

After unpacking, check the analyzer and its accessories as well as any possible damage sustained in transit, which must immediately brought to the attention of the carrier so that a statement of damage can be made.

The various parts of the MPP 5Gs are carefully checked and tested before shipping. Nevertheless, it is worth checking that the equipment received corresponds to the packing list enclosed.

On taking delivery of the MPP 5Gs, unpack all these parts.

Put the analyzer on a workbench near electrical sockets. Allow enough space for access to the rear connectors. Leave sufficient space behind the analyzer for cabling access and for clear ventilation.

WARNING! Once the analyzer has been unpacked it is best to leave it in the laboratory for a while before the first switching on for the analyzer comes back to the operating temperature (adapt the time according to the temperatures at which the analyzer has been stored).

4.2.Unlocking the shock absorbers

The MPP 5Gs cooling compressor is mounted on shock absorbers that must be locked during transportation. The shock absorbers is locked by bolts that screw in underneath the unit (please refer to the document DOCV224X001). To ensure that the bolts are removed after transportation the unit will not sit flat on its base until they are removed.

When unwrapping the unit:

1. Remove the shock-absorber locking bolts from underneath the unit.
2. Screw them into the special storage panel at the back of the unit as shown below.

Shock absorber locking bolt *Special storage panel for shock absorbers locking bolts.*

Picture 1 and 2: Locking/unlocking the shock absorbers

4.3.Connections

4.3.1.Connection to the mains

After unpacking the MPP 5Gs the different extensions need to be connected and it should be plugged into different networks and circuits (see Picture 3 next page).

Regarding the connection of the MPP 5Gs to the mains, it should be noted that the analyzer is built to operate from 90 to 240 Volts, at 50 or 60 Hz, in accordance with the majority of countries where the analyzer is marketed. The power cable corresponding to the country of sale is supplied with the analyzer.

4.3.2. Optional DC power adapter

Optional DC/AC converter is available to power PMD100/PMD110 from +12DC; for example, car battery.

Contact ISL representative for more information.

4.3.3.MPP 5Gs / PC link

The MPP 5Gs analyzer is fitted as standard with an RS 232C interface and an RS485 interface.

4.3.3.1.RS485 serial link – Connection to the ALAN® Network

The MPP 5Gs has been designed to run under the Alan® management software developed by ISL:

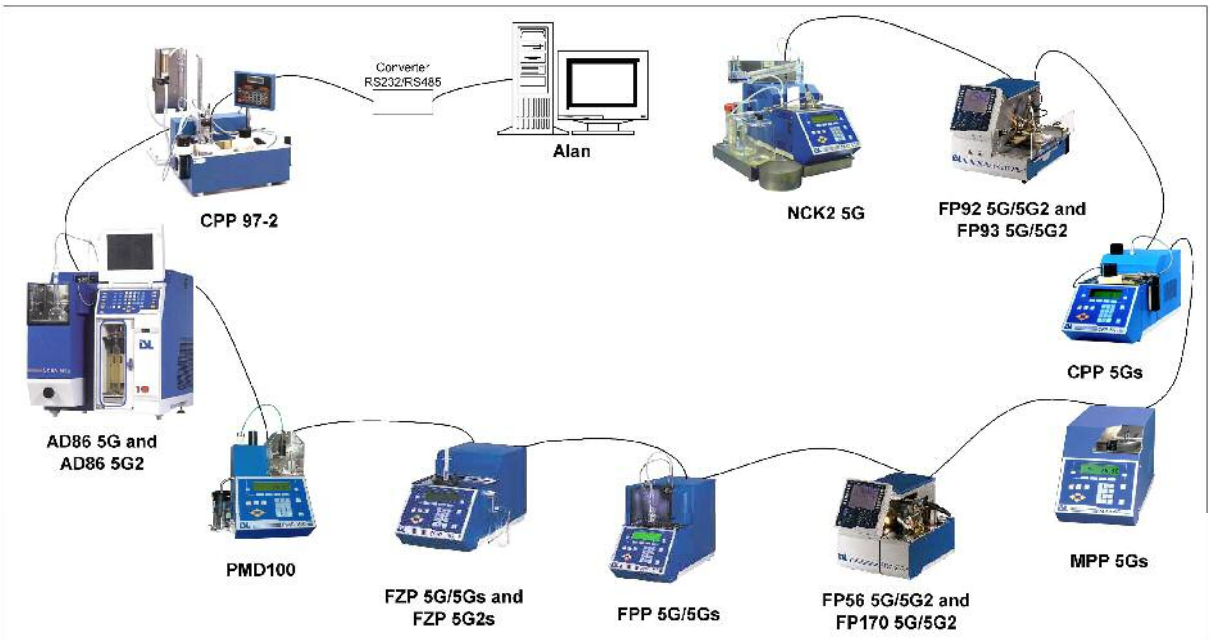
The **Alan®** software (**A**utomatic **L**aboratory **A**nalyzer **N**etwork) is a multitasking software running under Windows and allowing up to 31 ISL analyzers to be connected to the same PC computer (see the illustration below). It allows data coming from different ISL analyzers to be collected and stored.

Besides multi-analyzers results database management and control (according to the analyzer type: run control, alarms displaying, internal parameters management…), the ISL Alan® software allows transmitting results directly to a LIMS (or ever information system).

Note: The Alan® Kit is optional hardware and software package. Refer to the Alan® Installation and Getting Started Manual.

Each analyzer connects to the Alan® network via the RS485 serial interface through two ports (input/output) located on the rear panel (see Picture 3 on the next page for more explanations).

Example of an ISL analyzers network:



Note: The RS485 communication interface has to be parameterized. Refer to the section 7.6.2 - Alan® link setup: the "PC link" menu page 3-61.

4.3.3.2.RS 232C serial link

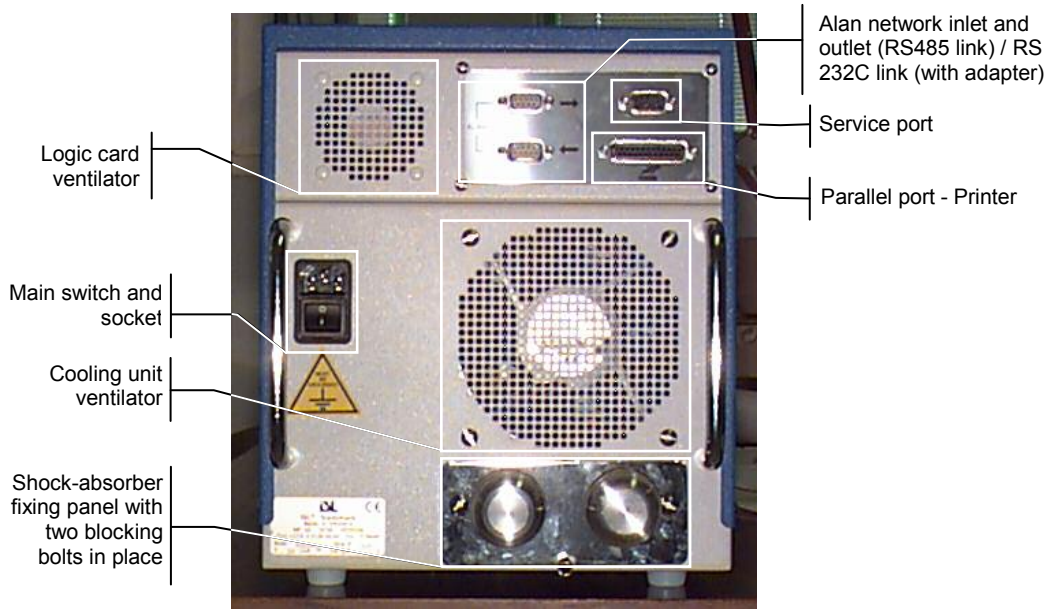
The network input / output ports of the analyzer link interface with the Alan® network may be connected via a special adapter supplied with the analyzer to form an RS 232C serial link enabling results to be collected on a PC and for transmission to a LIMS (see APPENDIX B - RS232 link features on MPP 5G page appendix 87 for the meaning of the messages).
Use the adapter supplied with the analyzer (see the Packing List): it has two RS485 connectors on one side, which have to be connected simultaneously to the analyzer's Alan input and output ports, and on the other side an RS 232C connector to be connected to the PC.

Note: The ISL analyzers allow transmitting data according to specific customized criteria and a user defined protocol.
The RS 232C communication interface has to be parameterized. Refer to the section 7.6.1 - RS232C link setup: the "RS232" menu page 3-60.

For more precision on the communication protocol of the RS 232C link and the message content, please refer to the APPENDIX B - page 87.

4.3.3.3.The "SERVICE" port

The MPP 5Gs has a serial « SERVICE » port as a standard fitting with which, with the help of the « ISL UDS » service software supplied, software updates can be downloaded via a PC and the contents of the memory such as the internal parameters and results can be saved for subsequent reloading (refer to the section 4.4 - File upload / download command: the "***ISL UDS***" menu page 4-75 for transfer commands).


Alan network inlet and outlet (RS485 link) / RS 232C link (with adapter)
Service port
Parallel port - Printer
Logic card ventilator
Main switch and socket
Cooling unit ventilator
Shock-absorber fixing panel with two blocking bolts in place

Picture 3: Rear panels and connections

4.3.4.Printer connection

A parallel port is provided at the back of the analyzer for connecting a printer compatible with the Analyzer (using PCL-3 or ESC/P language) with which to print out test results, among other things.

Caution! The analyzer and peripherals must be switched off before connecting any new peripherals.

5.Description of the analyzer

Overall, the MPP 5Gs comprises three main sections:

- The electronic Control Unit located at the rear of the analyzer
- A test bench (only one part of the sample changer is visible)
- The user interface (screen and keyboard)

Image 1 : MPP 5Gs Elements

The user interface will be the subject of the next chapter.

5.1.The Control Unit

The Control Unit contains:

- The electronic central processing unit
- The power supply unit

The electronic central processing unit contains the process control module, located in the upper part of the Control Unit (the Acquisition and the CPU electronic boards) and the regulation module, located in the lower part of the Control Unit (the Cooling Control electronic board).

The low-voltage electronics boards are controlled by the processor, which drives the entire system and performs regulation and measurement operations. It also ensures the interface with the operator (keyboard, displaying and printing).

The lower part of the system contains power-consuming devices: the power supply module and the cooling unit located at the rear of the Control unit, the sample changer and the test module.

The Control Unit receives information from:

- The system, by means of the temperature probe, the pressure sensor, the optical sensor, the changer positioning sensor and the sensor of sample presence in the test module.
- The operator, via the keyboard.

It supplies instructions and data:

- To the system, via the Regulation board
- To the user, via the LCD screen and printouts.

5.2.The test bench

The test bench, made up of the automatic sample changer and the cloud and pour point test module, is located behind the user interface. It contains a loading area accessible above the screen allowing samples to be loaded in the sample changer (see Picture 4 above). The sample changer allows programming up to 10 tests completely automated.

Note: To move the sample changer in loading position, activate the test context screen to program the next test (refer to the section 2.2 page 2-31).

CAUTION ! Do not move the sample changer by hand.

5.3.Test tubes

The MPP 5Gs is delivered with disposable cylindrical, flat-bottom glass vials corresponding to a 1 ml volume and their stoppers to contain the sample. A micro-pipe and disposable pipettes for the sample sampling are available as option (refer to the Spare Part List; DOCV224X200). Refer to the chapter 2 - The first test page 2-29 for the entire test initiating procedure.

Note: Test tubes are intended to a unique usage. For reliable results, use a new vial and a new stopper for each test.

6.The user interface

6.1.Front panel

The front panel of the analyzer appears thus:

Back-lighted 8-line LCD
LCD navigation key
Keys : Stop, Reset and Alarm stop
Direction keys
Activation keys for menus or buttons displayed on LCD
Numeric keypad and CANCEL and ENTER keys
MPP 5Gs

Picture 4: MPP 5Gs front panel

6.1.1.The LCD

The front panel of the analyzer therefore includes an 8-line LCD which may be represented thus:

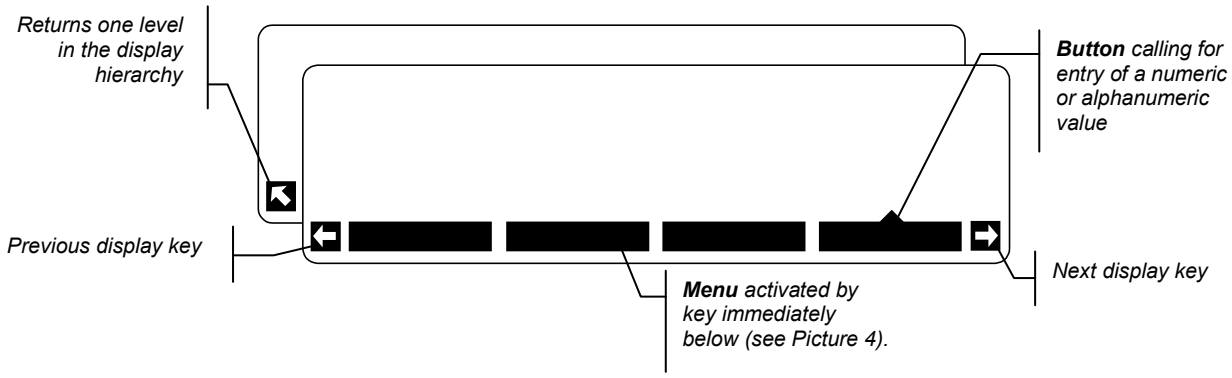

Returns one level in the display hierarchy
Button calling for entry of a numeric or alphanumeric value
Previous display key
Next display key
Menu activated by key immediately below (see Picture 4).

Figure 1: General operation of display and menus

On either side of this display, two buttons make it possible to travel up and down the hierarchy of menus (press the navigation keys – see Picture 4 above – corresponding to the **NEXT SCREEN** and **PREVIOUS SCREEN** buttons – see Figure 1 above – to activate them). In the lower part of the display, there are four keys by means of which the menus displayed on the display can be activated.

6.1.2.Backlight setting

The LCD screen backlight is set by a combination of the **ENTER** key and the high **DIRECTION KEY** for less contrast and low **DIRECTION** key for more contrast (refer to the next section).

*Note: **The intensity of the backlight can change according to the ambient temperature.***

6.2.The control keys

Three keys take up the lower left-hand side of the front panel, namely:

STOP/TEST: To stop a test or any other operation
If the LED is lit up, this means that a test is in progress.

RESET : To cancel and go up through the display/menu hierarchy

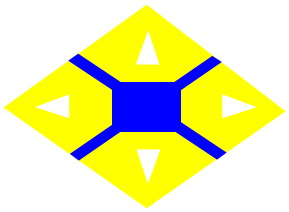
Interrupts the audible alarm signal (**ALARM STOP**)
If the LED is lit up, this means that a problem has arisen. Pressing on this button will give the error message content.

The rest of the front panel is occupied by a numeric keypad equipped with a **CANCEL KEY** and an **ENTER** key:

ENTER key: validate an input of variables.

to **CANCEL** characters.

Finally, in the lower left-hand section, there are four direction keys used to move around a text field and select characters to enter variables (e.g. name of sample), to move around the operator or product lists and in the result stock.



DIRECTION keys.

6.3.The Welcome display

When the analyzer is switched on, the welcome screen is displayed. If it does not, first check the backlight settings (see section 6.1.2 on the previous page).

This screen provides information about ISL and two menus offering the choice of language (when this choice has not been set as one of the analyzer's internal parameters).

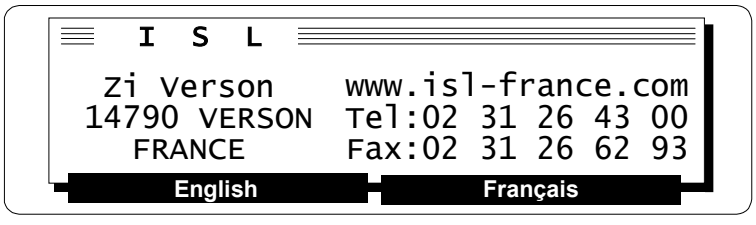


Figure 2: Welcome display.

This display remains active until the key corresponding to the language of your choice is pressed. Doing this activates the display 1 of the ***MPP Run/Start&Dsiplay*** menu (see Diagram 1 page 2-29).

- Press the key corresponding to the language of your choice to continue.

Note: You can disable the language choice as part of the startup parameters, refer to the section 7.1 page 3-58. If the choice is locked, press any key on the front panel.

7.MPP 5Gs system safety features

No parts of the analyzer at dangerous voltages are accessible by the operator (EN 61010-1). Any failure will be notified by audio alarm. The origin of failure and signaling alarms can be displayed on screen.

7.1.Type of alarm

7.1.1.Failure alarms

Failure alarms warn the operator in the event of a malfunction.
Failure alarm detection has at least one of the following consequences:

- A test cannot be started,
- A test in progress is stopped,

These failures set off a continuous buzz and the red LED of the **ALARM STOP** key lights up on the keypad (see section 6.2 page 1-25). Press the **ALARM STOP** key to display the alarm message (refer to the section 6 - List of alarms and treatment page 3-53 for description) and acknowledge it or not.
The red LED stays on for as long as the failure persists, even if the alarm has been acknowledged.

7.1.2.Warning alarms

Warning alarms warn the operator of an expected event (“End of test” for example).
They are accompanied by as for them a discontinuous alarm (the signal modulation is adjustable; refer to the section 7.3 page 3-59). The red LED on the **ALARM STOP** key lights up on the keypad. It goes off when the alarm is acknowledged.

Referral: The treatment of the failure and warning alarms and the description of the corresponding messages are shown in the chapter 6 - List of alarms and treatment page 3-53.

7.2.Access levels

There are 4 access levels (levels 1, 2 and 3 are protected by access codes):
Level 0: Operator level.
Information and basic functions are accessible without entering an access code.
Level 1: Head of laboratory level.
Level 0 **+** information and functions concerning the adjustment sheet, quality and settings for the operator are accessible at this level.
Level 2: Service level.
Level 1 **+** information and analyzer maintenance and technical settings functions are accessible at this level.
Level 3: ISL-reserved access level.

Selection of access levels is covered in the chapter 8 - Access levels and password: the "Access" menu page 3-63.

Once an access level has been confirmed by keyboarding the correct access code, it remains available until a lower access level is explicitly requested. When the system is switched on it goes to the configured default access level (refer to the section 7.1 page 3-58).

Part 2 Use of the MPP 5Gs with prestored products

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1.Introduction

This part will be concerned with all aspects relating to the test for determining cloud and pour points using prestored products. These products are created in the ***Run Environment*** menu of the main screens level accessible with a level 1 access authorization (Laboratory level, refer to the chapter 3 page 3-45). They are stored in a memory that can be saved or updated very easily (e.g. when a standard is changed) by downloading from a PC via the SERVICE port (refer to the chapter 4.4 page 4-75).

2.The first test

In this chapter we will deal with a cloud and pour point test carried out with the MPP 5Gs, stage by stage. We will, however, only describe the menus that are strictly necessary for the successful operation of the test, the main screen level being explained in Part 3. We will further assume that the operator has taken due note of the care that needs to be taken with the substances tested.

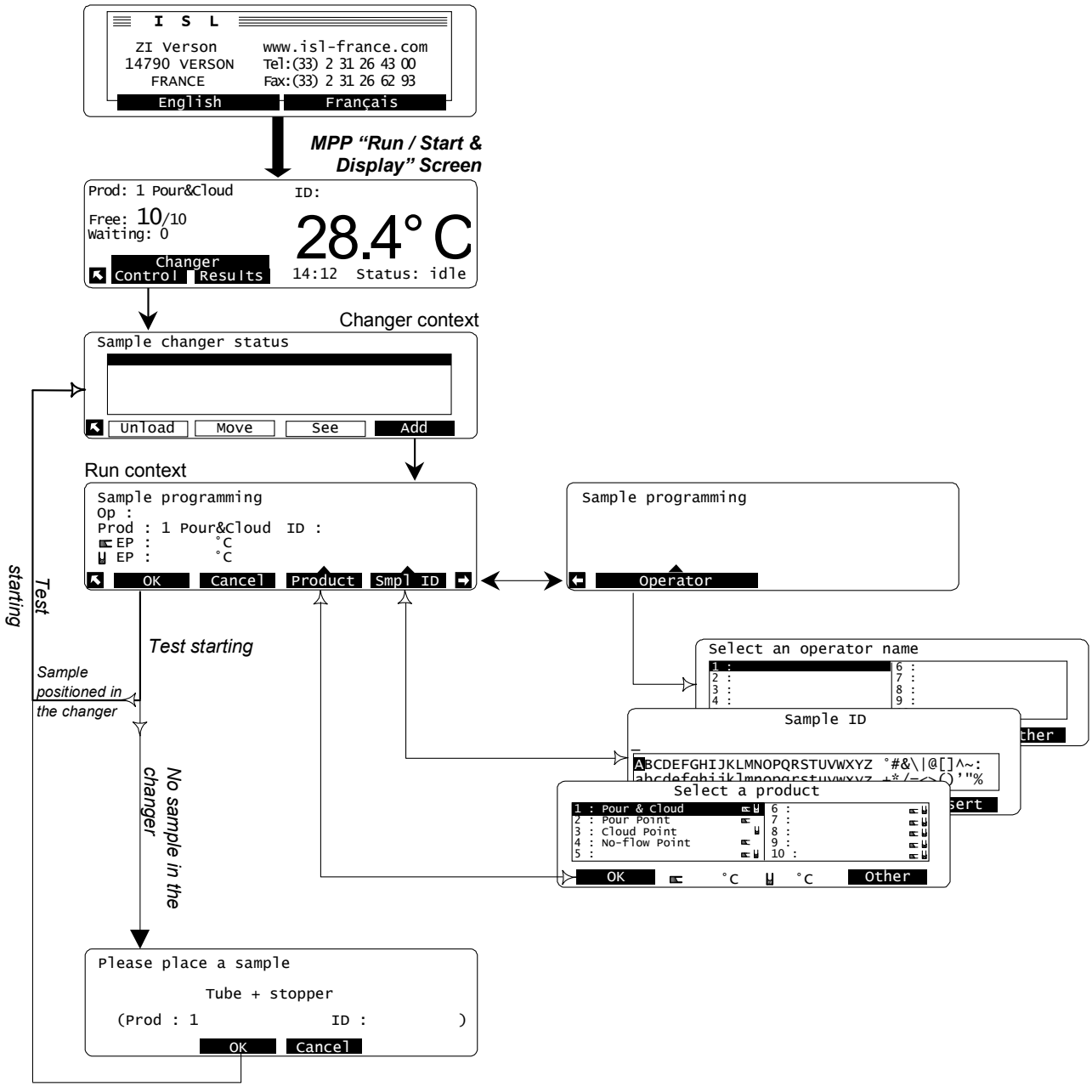

Diagram 1: Starting a test

When the analyzer is switched on, the welcome display, Figure 2 page 1-25, appears. After the language has been selected (or any key pressed if the language has been locked), the test visualization screen, the "MPP Run / Start & Display" screen, directly appears thus as described in the Diagram 1 on the previous page:

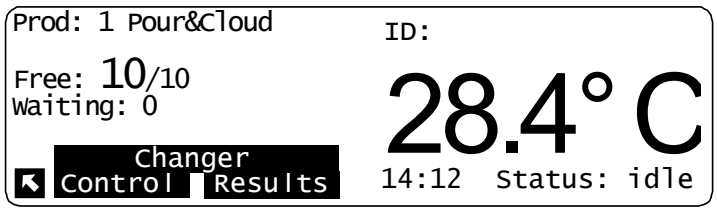

Figure 3: Test visualization screen ("MPP Run / Start & Display" menu)

WARNING! Once the analyzer has been unpacked it is best to leave it in the laboratory for a while before the first switching on for the analyzer comes back to the operating temperature (adapt the time according to the temperatures at which the analyzer has been stored).

This screen contains the following information:

- Prod: Number and name of the product proposed to carry out the test (selected by default at the analyzer switching on, refer to the section 2.2 page 2-31)
- ID: Identifying name or number of the sample in run progress (if it was filled in)
- Free: Number of places free in the changer / out of the total places
- Waiting: Number of test to carry out
- Sample temperature
- Time
- State of the analyzer (running, idle)

The "MPP Run / Start & Display" screen contains the following ***menu***:

- ***Control (of Changer)*** : Accessing to the changer context screen (samples programming)
- ***Results (of Changer)*** : Visualization of test results of samples in the changer if available

There are two points to be made in this respect :

- ***After switching on the analyzer, the display of the "MPP Run / Start & Display" screen above is obtained after the language has been chosen or any key pressed on the front panel if the language has been locked.***
- ***This screen is not placed hierarchically after the Welcome display. The arrow on the left bottom of the display, the PREVIOUS DISPLAY key (see in section 6.1.1 page 1-24), allows backing up on the main screens level (refer to the chapter 2 - The main level screens page 3-43).***

These measures have been taken to accelerate access to test-related menus.

The "MPP Run / Start & Display" screen allows accessing rapidly to the changer configuration menu, the changer context screen, as well as the test-starting menu by pressing the **CONTROL** key of the ***Changer*** menu (see the section 2.2 - Loading of a new sample and test starting page 2-31).

2.1.Sample preparation

Referral: Perhaps it will be necessary to preheat the sample for sampling. If it is the case, follow instructions of the standard test method.

↳ Remove 0,5 ml of sample using the micro-pipette and inject it in a the test vial (use only the ISL vials ref. M004245).

Inject the product with cautions: watch over the lower part of the vial features no mark or stain, especially for searching the cloud point.

↳ Close the vial with a stopper (use only the ISL stoppers ref.M01718).

CAUTION! Do not stick any label on the vial! Use an indelible marker if the vial has to be identified: the mark must be above the level of the product.

Note: Test tubes are intended to a unique usage. For reliable results, use a new vial and a new stopper for each test.

2.2.Loading of a new sample and test starting

Press the **CONTROL** key of the ***Changer*** menu of the "MPP Run / Start & Display" screen (Figure 3 page 2-30). The sample changer context screen is displayed:

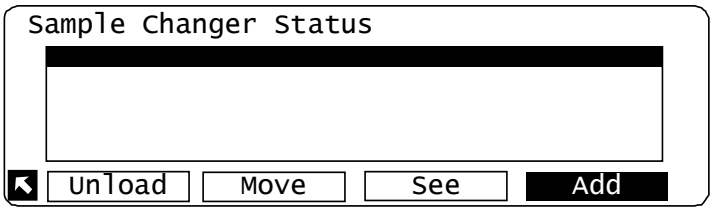

Figure 4 : Sample changer context screen

The changer context screen contains the list of samples programmed in the changer if they are. This screen contains also various ***menus*** and **BUTTONS**: ***Unload***, ***Move***, **SEE** and ***Add***. These menus enable adding and removing samples, modifying the order of tests and visualizing the test result if it is available and the test parameters of the product (refer to the section 2.6 - Using the sample changer page 2-37).

At this stage, the changer is empty so only the ***Add*** menu is valid allowing a new sample to be loaded in the changer. The other menus are inactive and appear in reverse video.

The ***Add*** menu allows accessing to the test context screen to configure the test of each new sample that will be loaded in the changer.

Press the **ADD** key of the changer context screen. The changer moves to present the closest empty place. The following screen appears momentarily:

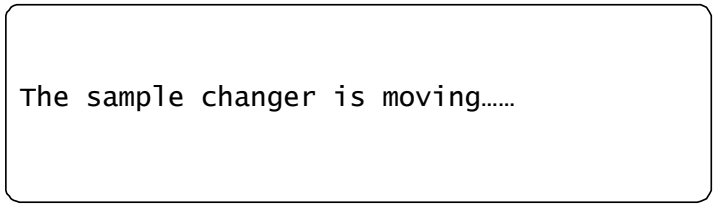

Figure 5 : Waiting screen during the changer moving

When the changer stops and the place which is free is in the front, you can load the sample:

CAUTION ! Do not try to load the sample if the place free is not correctly positioned.

Do not move the changer with hand.

The changer movements can have two origins:

- Normal unfolding of a test series,
- Operator request.

In the second case, it is important flagging up to the analyzer the action envisaged before handling the sample (refer to the section 2.6 - Using the sample changer page 2-37).

The screen 1 of the test context screen appears when the sample changer stops:

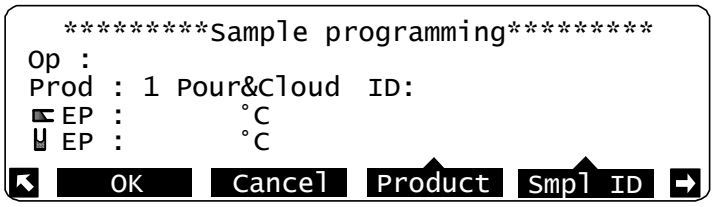

Figure 6: Screen 1 of the test context

The screen 1 of the test context screen contains the following **information**:

- Op : Operator name
- Prod : Number and name of the product proposed to carry out the test

  The product proposed when a new test is configured is a product selected by default when the analyzer is switched on. This product is factory set in the internal parameters (refer to the section 7.2 page 3-58). To select another product, refer to the section 2.5.1 page 2-35.
- ID : Identifying name or number of the sample
- EP : Research of the pour point programmed, expected point of the pour point programmed (optional)
- EP : Research of the cloud point programmed, expected point of the cloud point programmed (optional)

  The representative icon of each test is only displayed if the test has been programmed: it is possible to program a pour point test without searching the cloud point and inversely.

  It is neither imperative to enter the expected temperature of the pour point nor the cloud point. If an EP is programmed, you can read the value close to the icon of the test type it applies. Note that entering an EP allows the test time to be reduced and test starting temperature to be managed.

NOTE ! Entering an Expected Point for the cloud or the pour point is optional (parameter(s) adjusted in the prestored product) but doing this allows the test duration to be reduced about 30% (refer to the section 2.3 page 2-34).

This screen contains the following ***menus*** and **BUTTONS**:

- **OK**: Validation of run parameters and starting
- **CANCEL**: Returning to the previous screen without saving (screen of the changer context, Figure 4 page 2-31)

  Note: If the sample is still in the changer, remove it.
- ***Product***: Selection of the product used to carry out the test in the prestored products
- ***Smpl ID***: Keyboarding of the sample identifying name or number

Press the **NEXT DISPLAY** key of the screen 1 of the test context (the arrow on the right bottom, refer to the section 6.1.1 page 1-24) to access to the second screen of the test context:

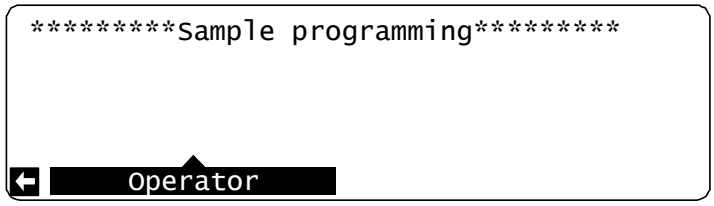

Figure 7: Screen 2 of the test context

The screen 2 of the test context contains the following ***menu***:

- ***Operator*** : Selection of an operator name in the list of prestored operator names

Note: All these information are optional to start a cloud and pour point determination test.

Actually if the product selected by default at the analyzer switching on is suitable for the next specimen to be tested, it is possible to start the test from now on, without configuring it. Sample and operator identifying is optional.

- If you want parametrizing the test: entering an operator / sample name, selecting another prestored product or creating a new one, refer to the section 2.5 - Characterization of the test page 2-35.

- If you want starting the test with the product selected by default: place the sample in the sample changer then press the **OK** key of the test context screen 1. The changer is moving: the system checks the presence of a new tube and the presence of a stopper on the tube.

  - If there is no stopper on the tube, the loading failure screen is displayed:

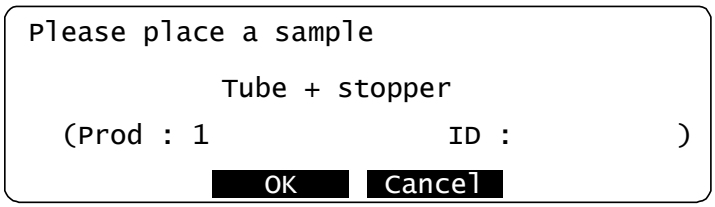

Figure 8 : Sample loading failure screen

Put a stopper on the test tube and press the **OK** key.

- If you do not have placed the sample yet in the changer, the confirmation screen for sample-loading is displayed:

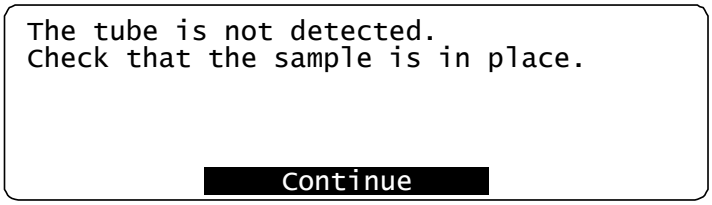

Figure 9: Loading confirmation screen

Position the sample in the changer then press the **CONTINUE** key to confirm the sample loading and start the test.

Note: This screen can appear with certain particular product. Press the **CONTINUE** key to start the test other all.

Once the sample is loaded, the changer moves and the system detects the new sample. The test vial is placed in the test module and the test starts.

The changer is ready to load a new sample.

The initial screen automatically returns to the changer context screen (Figure 4 page 2-31) that allows a new sample to be programmed.

Note: A vial can be inserted in the test module only if the temperature inside the cell is >23°C. A vial will be removed from the cell only if the temperature is >15°C.

2.3.Test in progress

First the MPP 5Gs heats the sample. The analyzer selects the starting temperature among three possibilities:

- Starting temperature programmed in the test product (refer to the section 2.5.1 page 2-35)
- EP_{pour} + 30°C if an expected point has been entered in the test product (choice of the highest EP)
- EP_{cloud} + 10°C if an expected point has been entered in the test product (choosing the higher temperature)
- 25°C by default

At the end of the preheating stage, the analyzer adjusts the beam of light of the optical test module emitter of the cloud point according to the product tested.

Then the MPP 5Gs cools down the sample:

↳ If an EP has been entered, the sample is cooled at a rate of –10°C/mn in a first time then at a rate of –1,5°C/mn when the sample reaches the temperature EP_{pour} + 30°C or EP_{cloud} + 10°C (the temperature taken account is the lowest temperature).

↳ If no EP has been entered, the sample will be cooled at the constant rate of –1,5°C/mn.

If a cloud or a pour point is detected during the fast cooling phase, the MPP 5Gs activates a second cooling cycle. So the sample is reheated at the current temperature + 30°C. Then the cooling phase starts again at the constant rate of –1,5°C/mn. In this case, the operator will be informed of this second cooling phase by an asterisk located above the field “Result” and a warning binary message (refer to the chapter 4 page 3-48).

As early as the cloud and pour points are found, the buzzer rings two times to warn the operator (the test is not completed). The result is stored and displayed:

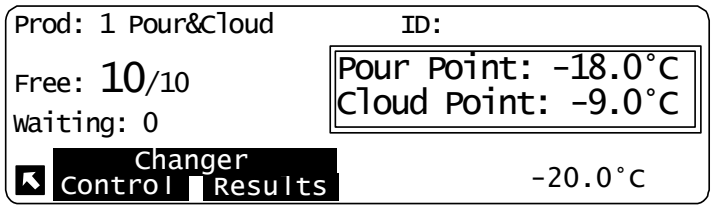

Figure 10: End of test screen (in preheating stage)

Then the final stage of sample reheating starts: the analyzer begins a faster warming up of the sample up to 15°C, thus allowing a new test to be begun rapidly. The rapid reheating stage is indicated by the flashing of the green LED of the **STOP/TEST** key on the analyzer keypad (please refer to the section 6.2 page 1-25).

2.4.End of test

The end of test is signaled by a warning alarm (discontinuous audio alarm) when the sample temperature reaches 15°C. The sample tested is then removed from the test module.

If the changer contains several samples, the following test will automatically start. If it is the only one test or the last one, press the **ALARM STOP** key to display the alarm message and to acquit it. The “End of test” message is displayed. Press the **ACQUIT** key, the sample(s) can be removed from the changer (refer to the section 2.6 page 2-37).

The MPP 5Gs measures the sample temperature at intervals of 0,1°C but results are given according to the test product parameters (refer to the section 3.1 page 3-45): for example the cloud point temperature can be rounded to the inferior degree to obtain results in agreement with the ASTM D2500 standard test method and its analogs. You can also select the frequency of pour point tests to obtain or not results in agreement with the ASTM D97 standard test method and its analogs. The MPP 5Gs also displays the no-flow point of the pour point test and the non-rounded temperature of the cloud point test.

To display these measures if the sample is still in the changer, press the **RESULT.** key of the ***Changer*** menu (refer to the section 2.6.3 page 2-38 for more explanations).

The personalization of test parameters, together with the display and printing out of stored test results, will be dealt with in the third part of this manual.

2.5.Characterization of the test

2.5.1.Selection of a pre-installed product

The product selected by default when the analyzer is switched on or when a new sample is loaded, is programmed in the analyzer internal parameters (refer to the section 3-58 page 3-58). It is possible to program another product than the one selected by default but the Level 1 access authorization is required (Laboratory level, see chapter 8 page 3-63).

If this product does not suit to carry out the test, press the **PRODUCT** key of the screen 1 of the test context (Figure 6 page 2-32). The ***Product*** menu enables the factory prestored product list to be displayed in order to select another product or to create a new one (refer to the section 3.1 page 3-45).

Various parameters are associated with each prestored product: research of cloud and/or pour point, temperature measurement unit, test starting temperature… These parameters are predefined in the ***Environment*** menu of the main level screens (refer to the section 3.1 page 3-45). So it is necessary to have a level 1 access authorization to configure a new product and store it in the prestored product list.

Four products are factory prestored in the MPP 5Gs product list. Activating the **PRODUCT** key of the MPP test context screen (Figure 6 page 2-32) displays the screen below:

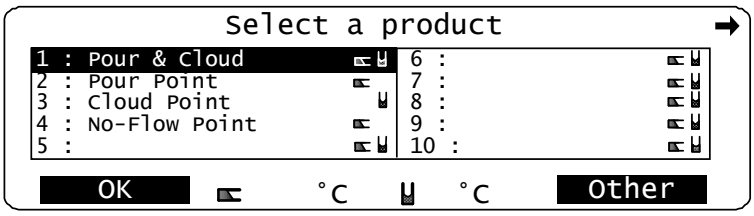

Figure 11: Selection screen of a product of the "MPP Run /Start & Display" menu

The screen of the product selection menu contains the following **information**:

- Product list
- Under the list: main characteristics of the product activated: "Pour" icon if the research of the pour point is programmed; Expected temperature of the pour point if it is programmed in the product; "Trouble" icon if the research of trouble point is programmed; Expected temperature of the trouble point if it is programmed in the product.

In the example above, the product activated is the product N°1: "Pour & Cloud". The icons located at the bottom of the screen indicate the analyzer will carry out a cloud point test and a pour point test. No expected temperature has been entered.

The screen of the product selection menu contains the following ***menus*** and **BUTTONS**:

- **OK *:*** Selection of the product – return to the screen 1 of the test context (Figure 6 page 2-32)
- ***Other*** : Configuring a new product (which will not be registered in the prestored product list)

The MPP 5Gs analyzer can store in its memory up to 40 prestored products; the black arrow in the top right-hand corner of the screen indicates the presence of additional lists following on. Use the **RIGHT** and **LEFT DIRECTION KEYS** to move from table to table and scroll through the different pages of products.

To select a prestored product, enable the corresponding field with the **HIGH AND LOW DIRECTION KEYS** or enter the line number (XX, 0X or X+**ENTER**). When the required field is activated, press the **OK** key to confirm the selection and to automatically return to the screen 1 of the test context (Figure 6 page 2-32).

The ***Other*** menu lets you create a new product to configure a test without using a prestored product but this new product will not be stored in the list of prestored products. This method is therefore recommended for one-off tests only.

Press the **OTHER** key. The screen 1 of the product ***Environment*** menu is displayed allowing to configure all parameters of a product. Refer to the Table 1 page 3-46 for the procedure to follow.

2.5.2.Sample identifying

Press the **SAMPL ID** key of the test context screen (see Figure 6 page 2-32) to complete the information regarding the sample identifying. The "Sample ID" entry screen is displayed. Enter the sample identification name according to the procedure explained in the section below (see section 2.5.4 on the next page).

After confirming the sample ID by pressing the ***OK*** key, the initial screen returns automatically to the test context screen.

2.5.3.Operator ID

Press the ***Operator*** key of the screen 2 of the test context (see Figure 7 page 2-32) to complete the information regarding the operator identifying. The list of prestored operator names is displayed:

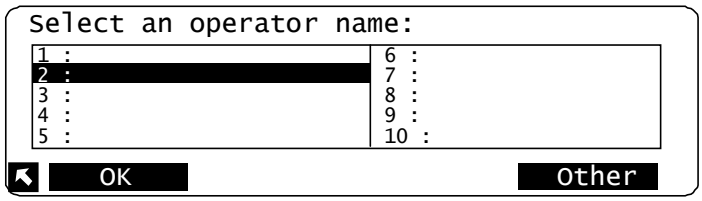

Figure 12: List of operator names

The MPP 5Gs can store up to 10 operator names. If the name required has already been saved, select the corresponding field with the **DIRECTION KEYS** on the front panel or enter the line number (XX, 0X or X+**ENTER**), and then press **OK**, the initial screen returns automatically to the screen 2 of the test context.

The ***Other*** menu lets you identify a new operator, but not record this new name in the list of prestored names (this operation requires level 1 (Laboratory level authorized access). This method is therefore recommended for one-off tests only. To create a new name and save it in memory, refer to the section 3.2 page 3-47.

Press the **OTHER** key to display the “Operator name” text entry screen. Enter the operator name according to the procedure described below (see section 2.5.4 on the next page). After confirming the operator ID by pressing the ***OK*** key, the initial screen returns automatically to the test context screen.

2.5.4.Text entry display

2.5.4.1.Text entry

On this screen, the sample-identifying name for example can be entered. Values for the fields offered can be entered by means of the corresponding buttons. Thus, to enter the sample-identifying name, the ***Smpl ID*** button of the test context screen is pressed (see Figure 6 page 2-32). The following display then appears:

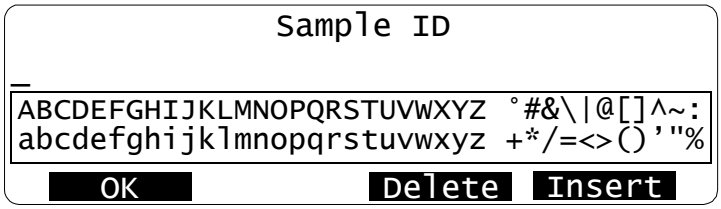

Figure 13: Text entry screen. The field concerned is the sample-identifying name (sample ID).

This display is typical of text entry displays. It is found at all points and is essentially made up of two parts:

- A **variable** part, on the upper part of the display, which is the name of the field.
- A **recurrent** part (whatever the field is) consisting of an alphabetic table (from which the characters to be entered are selected) and three buttons: **OK, DELETE** and **INSERT**.

The characters are entered in the following way:

1. On the entry display, a black rectangle flashes on the first letter of the table ("A"). To select a letter, use the direction keys on the front panel. Press the key as often as necessary (or keep the finger pressed on it) to indicate the direction of the character sought.
2. When the flashing rectangle is positioned on the character sought, press the **ENTER** key on the **NUMERIC KEYPAD**. If the character is incorrect, cancel it with the **CANCEL** key.
3. If there is a mistake in the string of characters entered, use the **DIRECTION KEYS** and the ***Insert*** and ***Delete*** buttons to remedy it.
4. Finally, validate with the **OK** button of the text entry display.

Proceed in similar fashion for the operator name.

After validating, the initial display returns automatically (in this case, to the test context screen). The same is true at each entry of text variables by means of the text entry display.

Note: To speed up the test run procedure, the text entry screen has a semi-automatic input feature.

2.5.4.2.Assisted edition

To make the text entry easier, the text entry screen enjoys a semi-automatic input feature: the latest text inputs are stored in memory so that the operator only needs to enter the first two or three characters for the whole to be displayed.

If the ***Auto Edition*** function is activated, the analyzer proposes a suite when characters are entered according to prior enters. This function can be configured or deactivated (refer to the section 7.1- Power on parameters: the "General" menu page 3-58).

2.6.Using the sample changer

Information regarding the various samples present in the MPP 5Gs sample changer are displayed in the changer context screen. Press the **CONTROL** key of the ***Changer*** menu of the "MPP Run / Start & Display" screen (see Figure 3 page 2-30), the changer context screen is displayed:

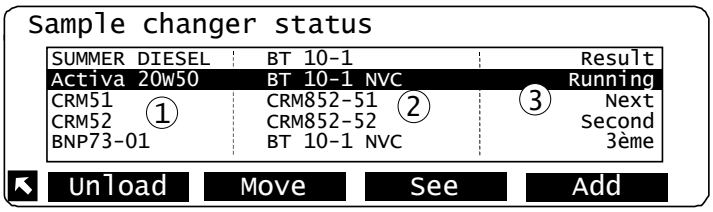

Figure 14 : Changer context screen

The changer context screen allows displaying the list of samples loaded in the changer and the state of each test programmed.

This list contains the following information:

- 1 : Name of the product selected to carry out the test
- 2 : Identifying name or number of the sample
- 3 : State of the sample in the changer
  - Result : Test carried out, result available on the analyzer
  - Running : Sample loaded in the test module, test running
  - Next : Sample in first waiting position of test
  - Second : Sample in second waiting position of test
  - 3ème : Sample in third waiting position of test
  - …..
  - Tube: a vial not programmed is present in the changer

This screen contains the following ***menus*** and **BUTTONS**:

- **UNLOAD** : Unloading the sample selected (test in reverse video)
- **MOVE** : Modification of the tests order
- **SEE**: Visualization of the test result of the sample selected (if available) or of the parameters of the associated product
- ***Add*** : Loading a new sample (refer to the section 2.2 page 2-31)

These menus will allow carrying out different operations so that:

2.6.1.Unloading a sample

Select the field corresponding to the sample you want to unload using the **DIRECTION KEYS** then press the **UNLOAD** key. The changer moves to position the sample selected in the front to be unloaded. A waiting screen appears (see Figure 5 page 2-31) then the following screen is displayed:

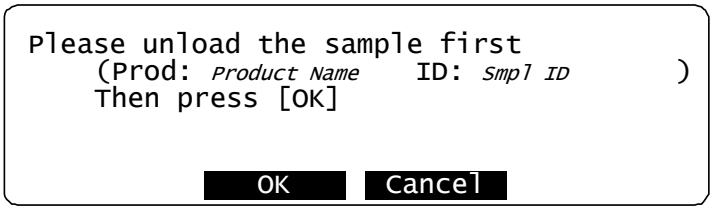

Figure 15: Unloading a sample

Remove the sample presented then press the **OK** key. The list of samples programmed in the changer is automatically updated and the sample removed disappears from the changer context screen.

Note: It is not possible to directly unload a sample running. The test must be stopped first using the STOP key.

From now, the ***Result*** menu of the main screens level will be used to visualize the result of the sample unloaded (refer to the chapter 4 page 3-48).

If you do not want longer to unload the sample, just press the **CANCEL** key.

The screen automatically returns to the changer context screen (Figure 14 above).

CAUTION! If for a reason unknown the sample to unload is not in the front, use the diagnostic mode to move the changer (refer to the section 1.2 page 4-68).

2.6.2.Moving a sample

This function allows test order to be modified. Select the sample you want to move using the **DIRECTIONAL KEYS** then press the **MOVE** key of the changer context screen (Figure 14 page 2-37). The following screen is displayed:

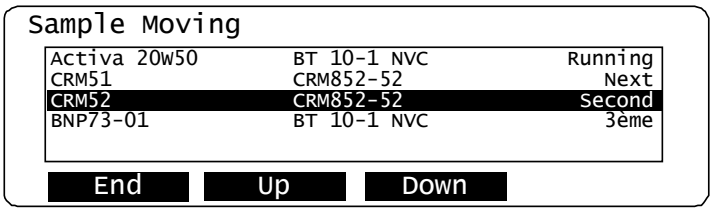

Figure 16 : Modification of the tests programmed order

In the example above, the sample that will be moved is the sample programmed in second position after the test in progress.

Press the **HIGH** key to move it in first position or the **BOTTOM** key to move it in the third position.

Press the **END** key to return to the changer context screen.

Note: A sample being just added is always placed in last position so this function will enable you to perform the test more quickly.

2.6.3.Visualizing the test result of a sample in the changer

From the visualization screen of a test running (Figure 3 page 2-30) or the end of test screen (Figure 10 page 2-34), press the **RESULT** key of the ***Changer*** menu. From the changer context screen (Figure 13 page 2-36), select a test completed (status: "Result") then press the **SEE** key.

The display allowing access to all available test results of samples in the changer, which are shown as the display below is displayed:

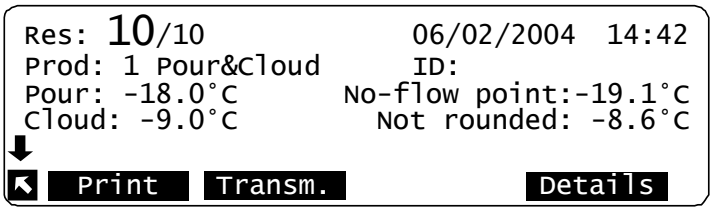

Figure 17 : Visualization screen of a test result in the changer

For more explanations on data displayed and menus proposed, refer to the section 4.1 page 3-48.

The black arrow at the left bottom of the screen indicates the position of other registered results. To scroll through the results, press the **HIGH OR LOW DIRECTION KEY** as many times as needed (refer to the section 6.2 page 1-25).

Note: If a test has been stopped, because of a failure for example, the cause of the stop is displayed replacing the result.

2.6.4.Visualizing the test parameters of a sample in the changer

Select a test in the changer context screen. If the test has already been performed, press the **DETAILS** key of the result visualization screen (refer to the previous section).

If the test has not been performed yet (status: "Next", "Second", …) press the **SEE** key. The following screen appears:

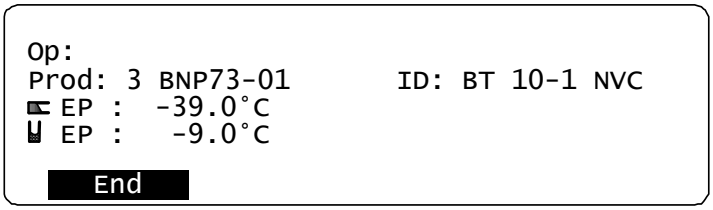

Figure 18 : Test parameters

It contains the following **BUTTON**:

END: Returning to the test context screen

This screen contains the following **information**:

- Op : Name of the operator
- Prod : Name of the product selected to carry out the test
- ID : Identifying name or number of the sample
- EP : Search for the pour point programmed, expected temperature of the pour point programmed: -39,0°C
- EP : Search for the cloud point programmed, expected temperature of the cloud point programmed: -9°C

2.6.5.Load a new sample

Press the **ADD** key of the changer context screen. The changer moves and presents the ideal place:

- The changer will first present the places containing vials not programmed.
- If they are not, the changer will present the empty places.
- If they are not, the changer will present places taken up by samples already tested.

Remove the sample presented if the placed is taken up then load the new sample. If it is necessary to select a product (different from the one proposed by default) or if you want configure the test (sample and/or operator identifying), refer to the section 2.5 - Characterization of the test page 2-35).

2.7.Stopping a test running

To stop a test running or all the tests programmed in the changer context screen, press the **STOP/TEST** key on the front panel of the analyzer, the following screen appears:

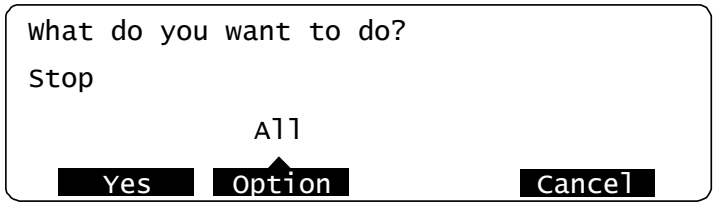

Figure 19 : Stopping a test running

The screen 1 of the test context contains the following ***menus*** and **BUTTONS**:

- ***Yes :*** Stopping the test selected or all tests programmed in the changer according to the option selected
- ***Option :*** Selection of the stop type (Flip-flop command)
  - All : stopping the test running and the changer
  - This test : stopping the test running, automatic starting of the following test(s)
  - After this test : stopping the changer after the end of the test running
- ***Cancel :*** Return to the previous screen without stopping any test

Press the **OPTION** key to make scrolling the various possibilities (Flip-flop command) then press the **YES** key to apply your choice and to return to the previous screen (Figure 14 page 2-37).

When the changer will be stopped, the ***Add*** menu of the changer context screen will be replaced by the ***Restart*** menu, which will allow you to start again the test series of samples in the changer. So it is very easy to stop the analyzer after one test and start again the test series the next morning just by pressing the **RESTART** key.

If a power cut occurs, the test context of samples in the changer being registered in the NVRam memory of the analyzer, the test series will restart where it was but the test in progress is canceled. According to the setup of the internal parameter “Restart Auto” (refer to the section 7.2 page 3-58), the test series will automatically restart or when the operator will press the **RESTART** key.

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Part 3　Advanced use of the MPP 5Gs

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1.Introduction

This part deals with the advanced use of the MPP 5Gs, i.e. the setting of the analyzer according to the needs of the user. As previously indicated, this presupposes that the user is familiar with the techniques of plugging tests.

The MPP 5Gs settings are accessible from the main screens level (see the Diagram 2 below).

2.The main level screens

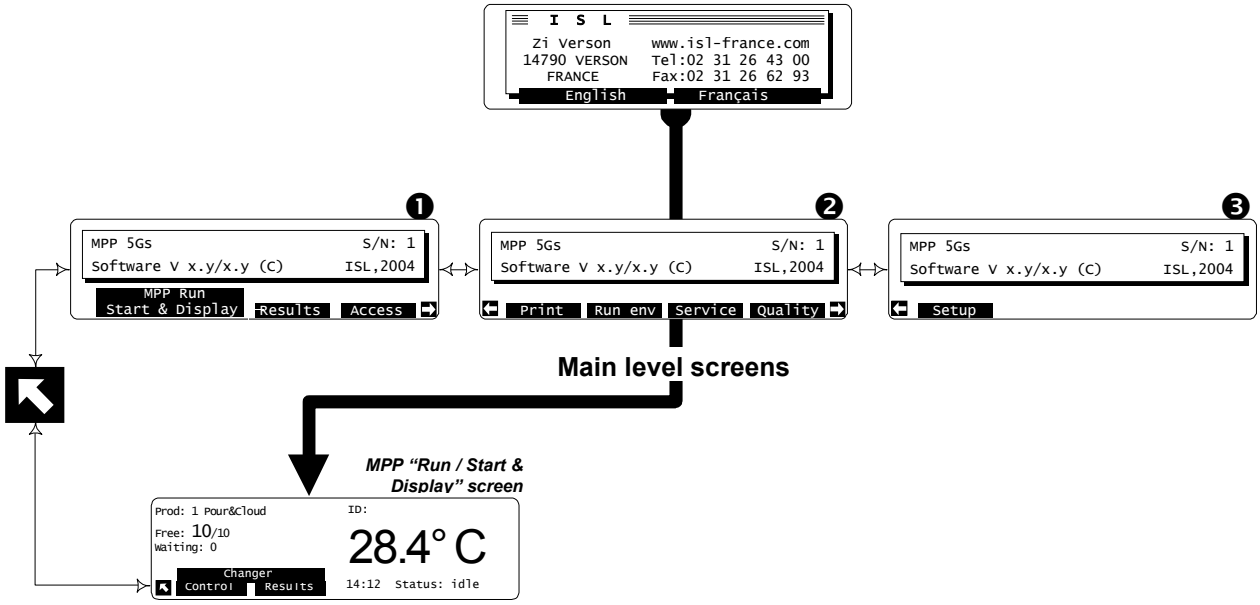


Diagram 2: Access to the main level

The main level display is the highest hierarchically speaking. It is not directly accessible when the unit is switched on.

To access it, after switching on the unit and selecting a language (or pressing any key if the language has been locked), it is necessary to go up one display level (press the **RETURN ONE LEVEL** button; Refer to the section 6.1.1 page 1-24).

The Diagram 2 above shows how access to this level operates (refer to the APPENDIX C - page 95 for a complete view of menu functionalities).

- If the user has operator level access (access 0), a simple menu is available (❶):
  - A test can be started and followed.
  - A result and result details can be displayed and printed.

- Users with laboratory (access 1) or service (access 2) level access have a complete menu (❶+❷+❸).

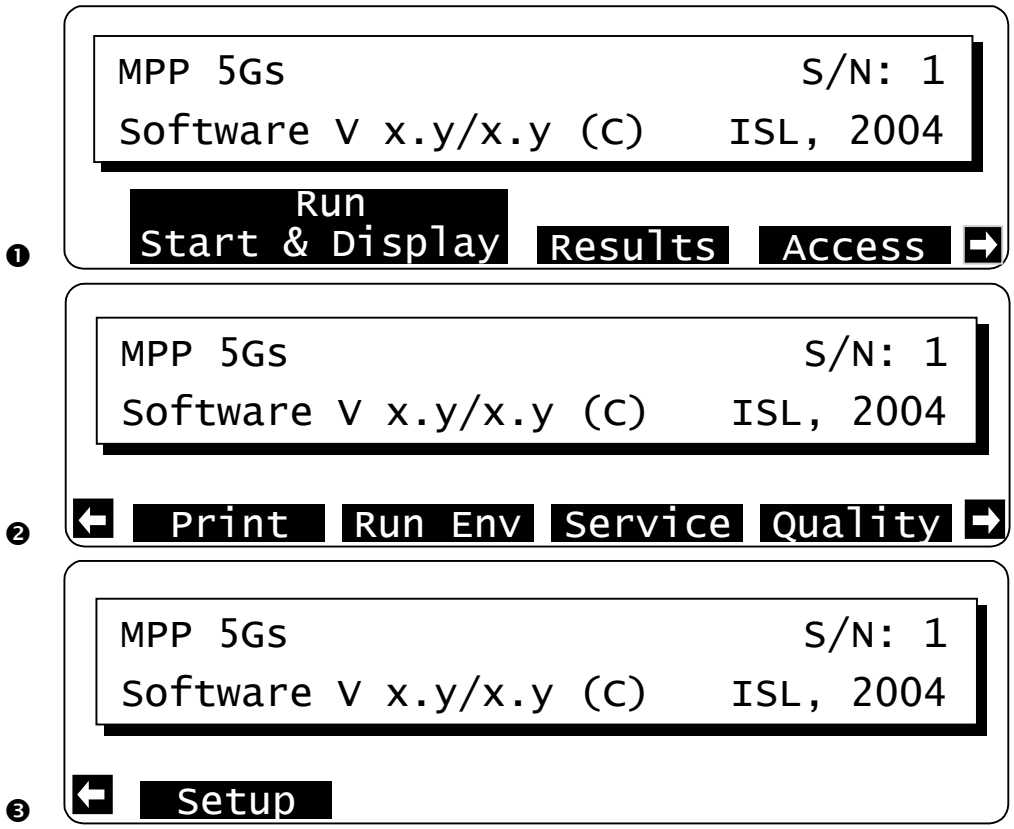


Figure 20: The three displays of the main menu.

The main level screens include the following components, respectively from top to bottom and from left to right:

- The name of the analyzer.
- The serial number of the analyzer.
- Driver and dialog text software versions

The menus of the main level are ***Run MPP / Start & Display, Results, Access, Print, Run Environment, Service, Quality*** and ***Setup***. These menus will be dealt with in detail in the paragraphs following.

It should be noted, however, that the ***Run MPP / Start & Display*** menu was covered almost in its entirety in Part 2.

In the following we shall assume that the access level is level 1 (Laboratory). This level allows access to the settings associated with tests, making it possible to modify them and thus design personalized products that respond to specific needs. The access levels will be dealt with through the ***Setup*** menu.

3.Setting and printing of operator name list and run parameters of prestored products

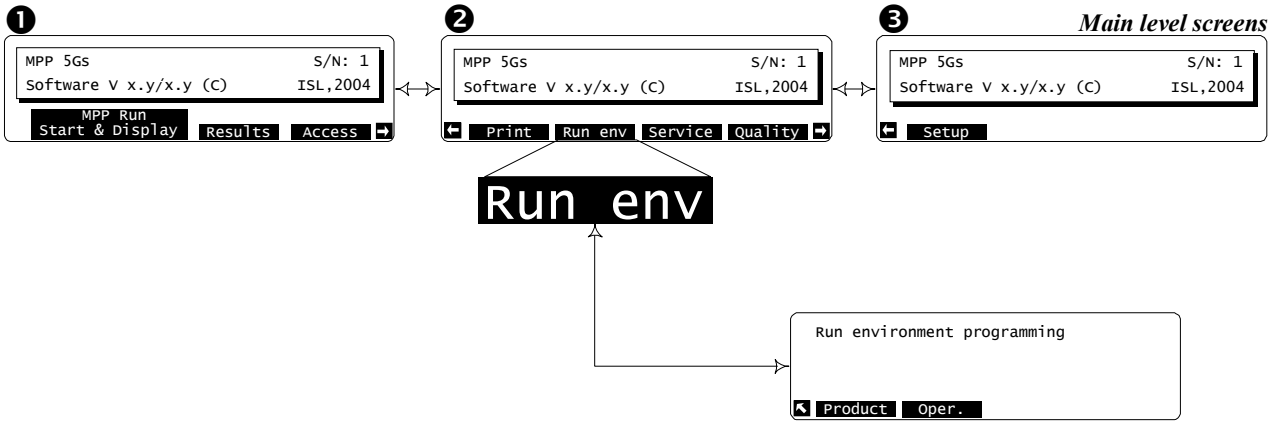


Diagram 3: The Run Environment menu

All run parameters of a product are visible but a product can only be created or modified if one has the level 1 access authorization (Laboratory).

To access to the configuration menu of the run environment, enable the ***Run Environment*** menu on screen 2 of the main level screens (see Diagram 3 above). The following screen is then displayed:

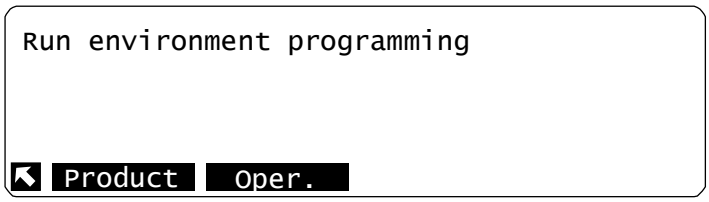


Figure 21: Run Environment menu screen

The ***Run Environment*** menu screen contains the following menus:

- ***Product*** : Displaying of the prestored products list to print, modify or add a new product
- ***Oper***. : Displaying of the operator names list to print, modify or add a new operator ID

Values in the fields of the Run Environ. ***menu screen cannot be changed without level 1 access (password), Laboratory.***

3.1.Run parameters of a product

The analyzer is delivered with 4 prestored products. Press the **PRODUCT** key in the ***Run Environment*** menu to display the list of prestored products, the following screen is displayed:

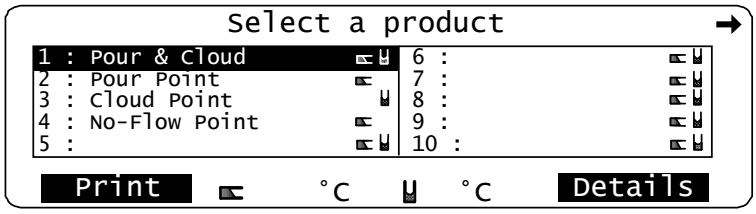


Figure 22: Product menu screen

The icon(s) corresponding to the type(s) of test programmed and the EP (if configured) appear under the list.

The ***Product*** menu screen contains the following menus:

- ***Print***: Printing of run parameters of the product selected. Press the **PRINT** key to start printing immediately (see the printout example in APPENDIX A - section 2 - page appendix 85).
- ***Details:*** Displaying and/or modifying the test parameters of the product selected (see the table below). Select a free field to configure a new product and store it the product list.

The MPP 5Gs analyzer can store up to 40 prestored products; the black arrow in the top right-hand corner of the screen indicates the presence of lists following on. Use the **RIGHT** and **LEFT DIRECTION KEYS** to move from table to table and scroll through the different pages of products.

Select a prestored product if you wish to modify its associated run parameters or select an empty field if you wish to create a new product. Press the **DETAILS** key, screen 1 of the product ***Details*** menu is displayed as shown in the table below.

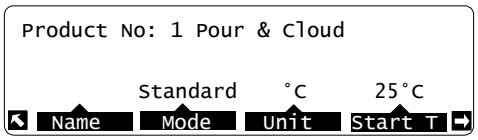
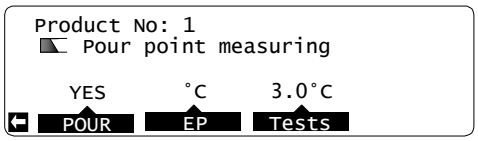
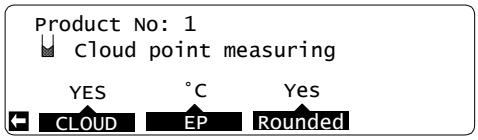
Display (***Product*** menu of the ***Run Env***)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Product*** menu display 1	Current product is N°1 ***Name***: Keyboarding of the product name ***Mode***: Selection of the sample cooling rate ***Unit***: Selection of the temperature measurement unit (Flip-flop command). The temperature is here measured in °C. ***Start.T:*** Keyboarding of a test starting temperature (preheating of the sample if necessary)	 String Standard / Slow °C/°F 25°C→60°C (77°F→140°F)
Press the **NAME** key to enter or modify the product name, this calls up the text entry display (refer to the section 2.5.4 page 2-36). ***Mode***: The sample cooling rate at the coming step of the cloud and pour point (EP_{pour}+30°C or EP_{cloud}+10°C) is default set to -1,5°C/min ("Standard" mode). It is possible for some products sensitive to cooling rate, to perform the test in low rate, that is to say -0,5°C/min. To modify the cooling rate, press the **MODE** key, the field toggles into "Slow" mode. **Note**: Using the slow cooling rate multiplies by 3 the test duration. The 0,5°C/min rate corresponds to the sample cooling rate average for the ASTM D97 standard method. Press the **START.T** key then enter a value on the **NUMERIC KEYPAD**.		
		Next display...
 ***Product*** menu display 2	***POUR:*** Programming or not of the pour point determination (Flip-flop command) ***EP:*** Keyboarding of the expected temperature of the pour point (optional) ***Tests*** : Keyboarding of the frequency of tests – interval of temperature between each tilting simulated	YES/NO -95°C→+45°C (-139°F→+113°F) 0/0.5→5°C (0/1.0→10°F)
Press the **POUR** key to scroll through the various possibilities: •YES: searching of the point •NO: do not search the pour point Keyboarding of the expected point: The EP is used to: ➢ determine the test starting temperature (Start.T = EP + 30°C) ➢ manage the cooling rates to speed on the test ➢ express the result according to the EP and the frequency Keyboarding the EP is optional. Tests: The analyzer always researches the no-flow point temperature of the pour point test. Tests = 0: only the no-flow point will be displayed. Tests = 1: the analyzer will deduce and display the pour point and the no-flow point. See result printout examples in appendix A, section 1.1.1 - and 1.1.2 - page appendix 85.		
		Next display...
 ***Product*** menu display 3	***Cloud:*** Programming or not of the cloud point determination (Flip-flop command) ***EP:*** Keyboarding of the expected temperature of the cloud point (optional) ***Results Rounded***: The results can be rounded to the inferior 1°C/1°F.	YES/NO -95°C→+45°C (-139°F→+113°F) Yes/No
Keyboarding of the expected temperature: The EP is used to: ➢ determine the test starting temperature (Start.T = EP + 10°C) ➢ manage the cooling rates to speed on the test Keyboarding of the EP is optional. Rounded: The analyzer researches the cloud point near 0,1°C. Rounded = No: only the non-rounded temperature of the cloud point will be displayed. Rounded = YES: the cloud point rounded to the inferior 1°C/1°F will be displayed with the non-rounded cloud point. . See result printout examples in appendix A, section 1.1.1 - and 1.1.2 - page appendix 85		

Table 1: ***Product*** *menu displays*

If an EP is entered for each test, the analyzer will select the higher EP to calculate the test starting temperature.

3.2.List of operator names

Press the **OPERATORS** key of the ***Run Environment*** menu to display the prestored list of operator names (up to 10), the following screen is displayed:

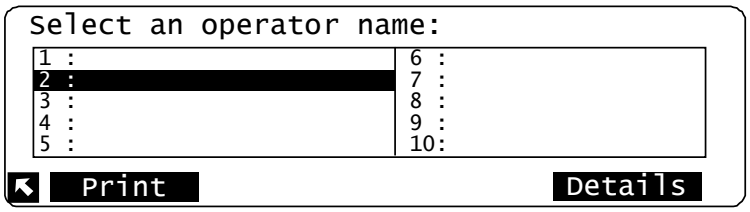


Figure 23: List of operator names

The ***Operator*** menu screen contains the following menus:

- ***Print*** : Printing of the list of operator names
- ***Details*** : Keyboarding of a new name in the list or modifying the name selected

The ***Print*** menu lets you print out the complete list of operator names. Press the **PRINT** key to start printing immediately. See the sample printout in APPENDIX A - section 3 - page appendix 85.

Select a prestored operator name if you wish to modify it or select an empty field if you wish to create a new operator name. Press the **DETAILS** key, the « Operator » text entry screen is displayed. Enter the name (see in section 2.5.4 page 2-36 for further details on using the text entry screen) then press **OK** to confirm.

4.Result displaying and printing: The "Results" menu

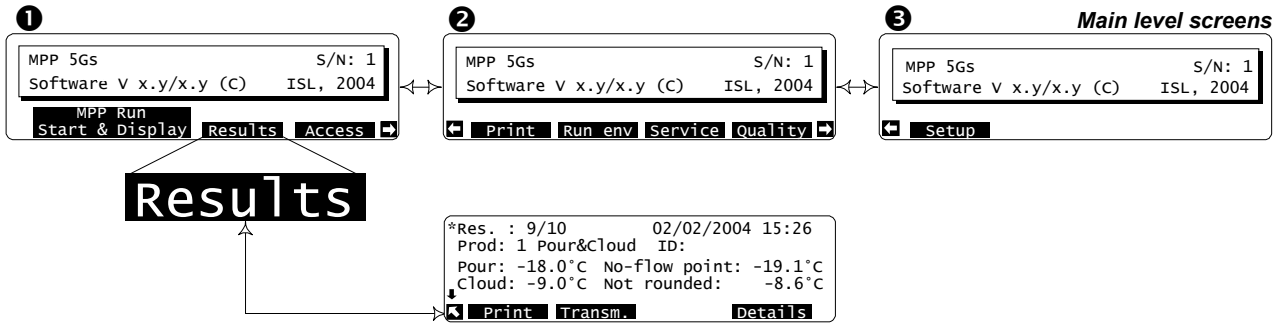


Diagram 4: The Results menu

Test results are stored in a dedicated memory. The MPP 5Gs can store up to 99 test results. When the memory is full, the MPP 5Gs control software automatically overwrites the first results recorded.

Results can be displayed, printed and sent to a PC (refer to the section 4.3.3 - MPP 5Gs / PC link page 1-20).

4.1.Result displaying from result memory

From the “MPP Run / Start & Display” screen (see Diagram 2 page 3-43), the user must go up one level in the display hierarchy. For this, press the arrow key on the left bottom of the display, the PREVIOUS DISPLAY key (see in section 6.1.1 page 1-24) to return on the main screens level.

Referral: The result of test being just carried out can be directly displayed from the « MPP Run/Start & Display » screen if the sample is still in the sample changer. Refer to the section 2.6.3 page 2-38.

1. Press the button for the ***Results*** menu of the main level screen 1; this calls up the display allowing access to all the results saved, which are shown as the display below.
2. To access the result required, press the **DIRECTION KEYS** as many times as needed (see section 6.2 page 1-25).

Note: Black arrows on the left of the screen indicate the position of other registered results.

The indication “ ⬅ Res x 10 ➡” appearing above the result number remind you it is possible to use the left and right arrow key to browse from 10 to 10 using the **RIGHT** and **LEFT DIRECTIONAL KEYS**.

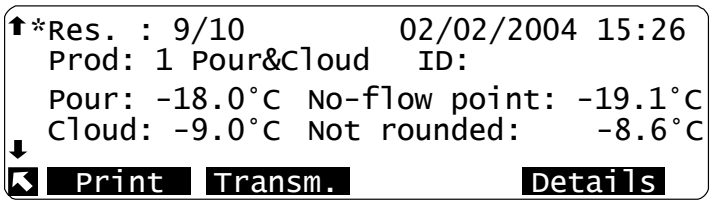


*Figure 24: Display of the **Results** menu.*

This screen contains the following indications:

- Res. : __/__: Number of the result displayed over the number of results stored in memory

  * : an asterisk appears in front of the result number if the test was run although a default had been notified or if a default occurred during the test (the **DETAILS** key allows displaying among others the warning binary message).
- Date and time of the end of the test.
- Prod : Name of the product used to perform the test
- ID : Identifying name or number of the sample
- The result message “Pour / No-flow point” and/or “Cloud / Not rounded”:
  - Pour: Value of the pour point according to the prestored product configuration (EP and tests frequency)
  - No-flow point: no-flow temperature of the pour test (only if the pour point is programmed)
  - Cloud: Value of the cloud point (only if the displaying of the rounded cloud point is programmed)
  - Not rounded: not rounded temperature of the cloud point (only if the cloud point is programmed)

If a test has been stopped because of a failure, the reason for the test stopping is displayed instead of the result. The following messages can appear:

1. "Cloud: Sample tmp safety at -105.0°C": The sample temperature has reached the system limits and the cloud point is not found.
2. "Pour: Sample tmp safety at -105.0°C": The sample temperature has reached the system limits and the pour point is not found.
3. "Cloud: Out of capability": The optical enslavement of the test module can not be realized.
4. "Pour: Out of capability": The detection system has reached its pressure limits and the pour point has not been found.

In case of failure alarm, the test running is stopped. The result will not be registered in the stock of result but the reason for the abandonment is displayed in the visualization screen of a test result in the changer (see section 2.6.3 page 2-38).

Test result in pour mode:

- If the EP has not been entered, the result will be a multiple of the frequency.
  Ex: Frequency = 3°C and no-flow = -6,2°C / Result = -6,0°C
  Frequency = 3°C and no-flow = -6,0°C / Result = -3,0°C
- If the EP has been entered, the result will be a multiple of the frequency according to the EP.
  Ex: EP = -8°C and frequency = 3°C / No-flow = -6,2°C → result = -5°C

Test result in cloud mode:

- If rounded = Yes, the result is rounded to the inferior degree (in °F, the result is also rounded to the inferior entire).
  Ex: Not rounded = -6,2°C / Rounded = -7,0°C
  Not rounded = -6,0°C / Rounded = -6,0°C

The result display contains the following **menus** and **BUTTON**:

- ***Print***: Printing of the result selected (displayed) and accessing to the printer setup menu – see next chapter
- ***Transm.***: Transmission of the result displayed through the RS 232C serial link (refer to the 4.3.3.2 page 1-21). Parameters linked to this communication mode have to be set (refer to the section 7.6.1 page 3-60). Result messages are transmitted under the form of character string in ASCII code (refer to the APPENDIX B - page 87 for the meaning of the content of the messages).
- ***Details***: Displaying of test parameters of the prestored product; displaying of the warning binary message in case of problem during the test.

Press the **DETAIL** key, the following screen appears:

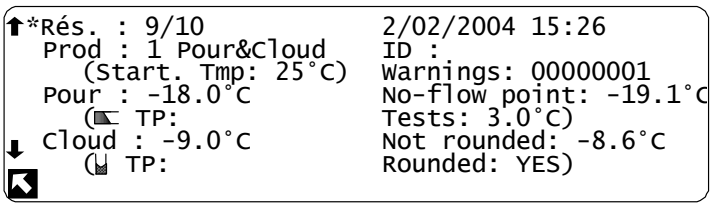


Figure 25: The Result Details display

Warning during test:

Displaying of bits in the following order: bit 7, 6, 5, 4, 3, 2, 1, 0

Bit	Significance
0	Bit 0 = 1 : Adjustment of the temperature measurement circuit have to be done or calibration values have been manually modified (refer to the section 4.2 page 4-75).
1	Bit 2 = 1 : Test performed with two cooling cycles
2	Not used
3	Not used
4	Not used
5	Not used
6	Not used
7	Not used

Printout of this additional information on the result ticket is disabled on factory-delivered MPP 5Gs units; however, an experienced user can enable these functions in the field (refer to the section 5.2- Printer setup page 3-51).

4.2.Result printing

The MPP 5Gs can print results in different ways: with or without detailed values (test parameters of the product, warning binary message) according to the analyzer configuration and equally, results of the last test or results of any test (refer to the APPENDIX A - page 83 for printing type examples).
It is also possible to print test results automatically after the end of the test. To be able to do this, make sure that the unit is linked up to a printer compatible with the analyzer (using PCL-3 or ESC/P language) and set “on line”.
From the display of the ***Results*** menu (Figure 24 page 3-48) press the ***Print*** key, the following display appears:

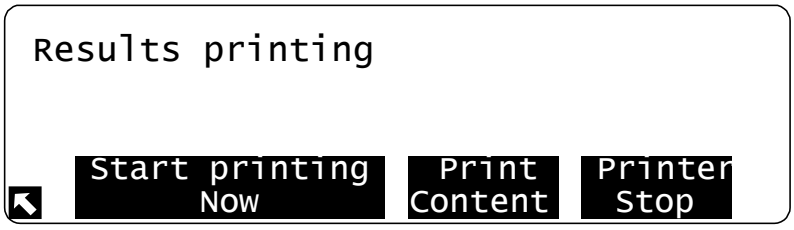


Figure 26: Print menu display (of the Results menu)

The display of the printing menu contains the following ***menus*** and **BUTTONS**:

- ***Start printing Now***: Starting of the printing of the selected result according to the printer setup.
- ***Print content***: Definition of the data to be printed and to set the printer.
  Pressing the **PRINT CONTENT** button calls up the ***Setup*** menu of the ***Print*** menu. Refer to the section 5.2 - Printer setup page 3-51.
- ***Printer Stop***: Stopping the current printing.

5.Printing and printer setup: The "Print" menu

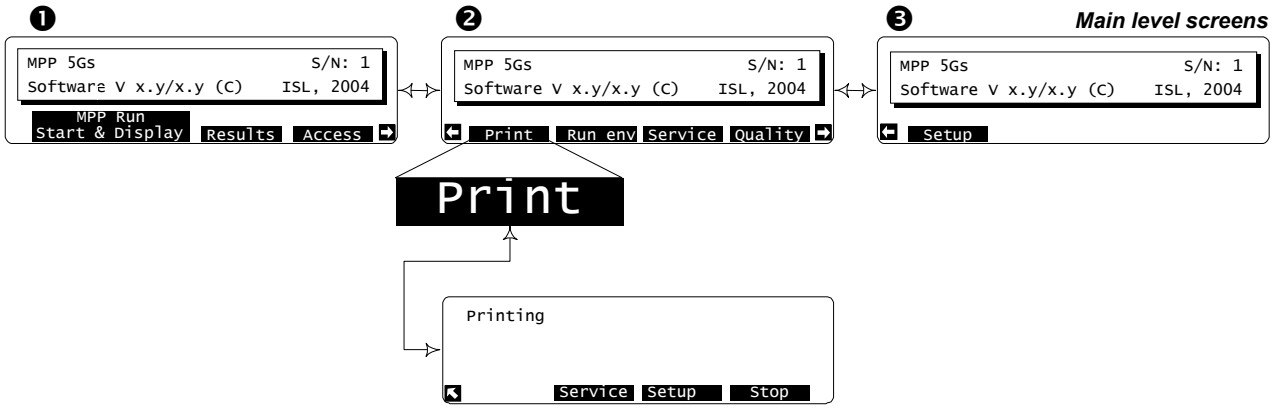


Diagram 5: The Print menu

To access to the printing setup menu, activate the ***Print*** menu of the main screens level; the following display will appear (as the Diagram 5 above describes it):

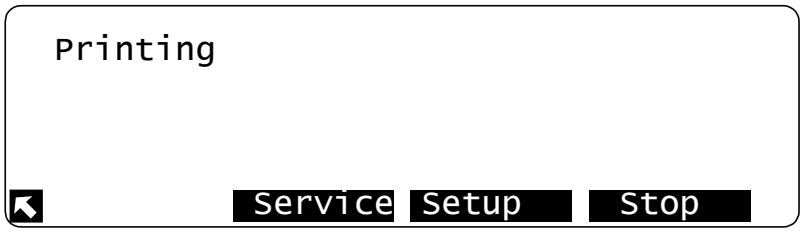


Figure 27: **Print** *menu screen*

The ***Print*** menu screen contains the following ***menus*** and **BUTTONS**:

- ***Service*** : Printing of the values of measurements and internal parameters (level 2 access required)
- ***Setup*** : Configuration of printing parameters
- **STOP** : Stopping of the current printing job

5.1.Service printing

The ***Service*** menu of the ***Print*** menu is designed for analyzer maintenance and requires a Level 2 access authorization. It contains submenus from which analyzer internal measurements can be printed, either instantly or during a full test run (monitoring regulation) and the analyzer internal parameters.

Refer to the chapter 3 - The "Service" menu of the main printing menu page 4-73.

5.2.Printer setup

Printings and printer configuration can be carried out by means of:

- The ***Setup*** menu of the ***Printer*** menu (screen 2 of the main screens level, see Diagram 5 above).
- The ***Printer*** menu of the ***Setup*** menu (screen 3 of the main screens level).

Press the **SETUP** key of the ***Print*** menu of the main screens level. The screen 1 of the ***Setup*** menu appears as shown in the table below:

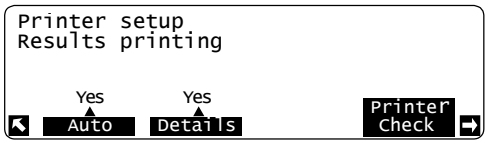
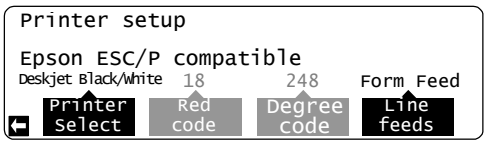
Display (***Setup***menu of the ***Print*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Setup*** menu display 1	***Auto*** : Automatic printing in once time of all test results of samples loaded in the changer at the end of test series ***Details*** : Printing of the product parameters and the warning binary message on the result ticket (refer to the section 4.1 page 3-48) ***Printer check*** : Starting of the printer test	Yes/No Yes /No
Example of using the automatic printing of results: if the analyzer performs a test series during night, the printer can be switching on the following morning to print all results (samples do not have to be unloaded before printing).		
		Next display...
 ***Setup*** menu display 2	***Printer select*** : Selection of a printer compatible with the analyzer (using PCL3 or ESC/P language)	Epson compatible ESC/P; 40 columns; DeskJet Black/White; DeskJet Color
	Red code: Code for printing in red (see printer doc.).	See printer doc.
	Degree code: ASCII code designating "degree" code (see printer doc.).	See printer doc.
	Line feeds: Number of line feeds after printing.	0 to 5; Form feed
E.g. : Configuration of a 40 column CITIZEN® printer 40 18 91 2 Configuration of an ESC/P 80 column printer ESC/P 248 2 Configuration of a DeskJet® Color printer: DeskJet Form Feed Color		
For the exact configuration, however, reference must be made to the manual supplied by the printer manufacturer.		

Table 2: Print / **Setup** *menu display*

Deskjet printers have particular working. They only print a page if it is full or when their buffer is full or when they receive a paper throw command.
If at least one of these three conditions is not fulfilled, these printers signal by a led flashing on the front of the printer that data are still in memory. In this case, pressing the corresponding key of the printer will start the printing then the ejection of the sheet.
Around eight results are needed to fulfill a sheet and to start the printing. It is also possible to set the parameter “Line feeds” on “Form feed” but the printer will print one result in one page.

6.List of alarms and treatment

6.1.Types of alarm

6.1.1.Failure alarms

The failure alarms warn the operator in the event of a malfunction.

Failure alarm detection has at least one of the following consequences:

- A test cannot be started,
- A test in progress is stopped,

These failures set off a continuous audio alarm and the red LED of the **ALARM STOP** key lights up on the keypad (see in section 6.2 page 1-25). Press the **ALARM STOP** key to display the alarm message and acknowledge it or not.

The red LED stays on for as long as the failure persists, even if the alarm has been acknowledged.

6.1.2.Warning alarms

The warning alarm warns the operator of the end of test of the last specimen sample in the changer.

They are accompanied as for them by a discontinuous audio alarm (the signal modulation width is adjustable; refer to the section 7.3 page 3-59 of this part). The red LED on the **ALARM STOP** key lights up on the keypad. It goes off when the alarm is acknowledged.

6.2.Displaying alarms, stopping the buzzer

When an alarm is triggered, press the **ALARM STOP** key to display the cause. The following screen is displayed:

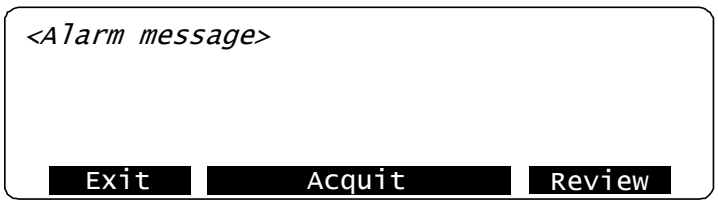


Figure 28: Alarms displaying screen

The alarms screen display contains the following **menus** and **buttons**:

- ***Exit***: going back to the previous screen without acquitting the alarm.
- ***Acquit.***: clearing the alarm and going back to the previous screen.

  Press the **ACQUIT** key to stop the buzzer and return to the previous screen. Note that the red LED on the **ALARM STOP** key stays on for as long as the default persists, even if the alarm has been acknowledged.
- ***Review***: displaying the alarm historical (see section 6.6 page 3-56)

6.3.Alarm processing

Certain alarm cases present a danger. This is why most default settings switch the analyzer into idle status, thus the cooling unit is cut out and the sample changer is stopped.

However, this is not to say that this type of analyzer is hazard-free or that if the analyzer fails to go into idle status the operator and/or analyzer are not in danger. It is important always to check what is going on whenever an alarm is triggered.

Caution! Generally when the alarm buzzer is triggered, the operator must display the cause and ensure that everything is working correctly.

For example, owing to a faulty component an alarm that normally should place the analyzer in idle mode fails to do so. In that case, the operator must intervene by switching off the analyzer.

See below for warning and failure alarm detailed description. A troubleshooting guide to aid in isolating and correcting problems detected by the analyzer system safety feature is proposed in the section 6.2 page 4-79.

6.4.Failure alarms

6.4.1.Memory failure

When the analyzer is switched on, the microprocessor checks the content of the different memories. If there is an error it will be detected by calculation and comparison with the checksum.

6.4.1.1.“Software memory (PROM)” failure

If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.1.2.“Data memory (Ram)” failure

If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.1.3.“Safe memory (NVM)” failure

The content of the saved RAM memory where the Analyzer internal parameters are stored is checked by the microprocessor. If there is an error, the Analyzer goes automatically into « download » mode so that the contents of the RAM memory saved can be restored by loading a backup file from a PC.

For this purpose, a diskette containing the internal parameter factory settings (necessary if memory has not been recently uploaded) and a PC up/download program are shipped with the standard version of the Analyzer. Refer to the section 4.4 - File upload / download command: the “***ISL UDS***" menu page 4-75 on how to load the Analyzer parameters.

Note: So as to have an up-to-date copy of the Analyzer’s internal parameters always to hand, it is advised to upload the internal parameters to the PC during routine maintenance operations.

Use a new file name each time this operation is performed. Do not use the internal parameter file name on the original diskette supplied with the analyzer.

6.4.2.“Low battery”

The battery for backing up the non-volatile back-up memory (NVRAM) has a service life of 7 to 8 years. This alarm may therefore be due to a faulty battery.

The system keeps a permanent check on this failure. If the failure is reported:

- Do not switch off the analyzer, as this will delete any stored data.
- Print or upload to a PC file the Analyzer parameters contained in the non-volatile back-up memory (NVRAM):
  - Uploading: refer to the section 4.4 page 4-75 on how to load the back-up memory (internal parameters, setting values, run environments and results).
  - Printing: the run environments (product run parameters, operator name list, see chapter 3 page 3-45) and the internal parameters (refer to the section 3.2 page 4-73).
- Switch off the Analyzer and call an ISL technician to replace the battery.
- Download the analyzer internal parameters or enter it (refer to the chapter 3 - The “Service” menu of the main printing menu page 4-73).

Note: Regular uploading of the internal parameters must be programmed as part of the analyzer maintenance procedure. Use a new filename (e.g. with the current date in the name- PIDDMMYY. NVM). This way the latest version of the internal parameters will be saved to a file.

6.4.3.“Signal conditioning (A/D Cnv)”

This failure is reported upon detection of no dialogue between the CPU and the A/D converter. Switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.4.“Cooling circuit”

The system checks the cooling circuit 2-min after cooling is commanded. The alarm is triggered if the cooling rate of the sample is lower than 65% during 120s (programmable threshold set by default, refer to the section 7.3 page 3-59).

A test currently running is stopped. Alarm is stopped each time a test is run.

6.4.5.“Heating circuit”

The system checks the heating circuit each time the heating commanded is higher than 50% and the cooling commanded is lower than 10%. The alarm is triggered if the speed of the rise in temperature of the sample is insufficient.

The system cuts the heating and the cooling command and stops a test being run.

6.4.6.“Sample temperature safety”

The system keeps a permanent check on this failure (except in “Quality” mode). The alarm is triggered if:

- The sample temperature is equal or higher than the “threshold +” configured (by default: +65°C programmable from –150 up to +65°C) during the recognition time (by default: 10s programmable from 0 up to 120s).
- The sample temperature is lower than “threshold-“ - 20°C (by default: -125°C programmable from –150 up to +65°C)

Note: During a test, if the sample temperature reaches the “threshold-“ + 20°C currently running is stopped but this will be registered with the message “Cloud: Sample tmp safety at -105.0°C” and/or “Pour: Sample tmp safety at -105.0°C”.

6.4.7.“Overpressure measurement safety”

The system keeps a permanent check on this failure. The alarm is triggered if the pressure in the test module is higher than 2300 Pa or if it is lower than –2300 Pa.

A test currently running is stopped. The test is not registered but the cause of stopping can be displayed in the visualization screen of the test result (refer to the section 2.6.3 page 2-38).

6.4.8.“Out of cloud point measuring”

This failure is signaled during a test: the optical control of the cloud point test module which occurs at test starting can not be realized whereas the cloud point is programmed. The test continues if the pour point is programmed. In this case, the result is registered with the message: “Cloud: Out of capability”.

Alarm is stopped each time a test is run.

6.4.9.“Out of pour point measuring”

This failure is signaled during a test if the detection conditions of the pour point have not been met whereas the detection system reaches its measuring limits. The test continues if the cloud point is programmed. In this case, the result is registered with the message: “Pour: Out of capability”.

Alarm is stopped each time a test is run.

6.4.10.“Error in the programmed product”

The preprogrammed product is controlled at test starting. If an inconsistency exists or if the control checksum is wrong, the test is canceled. The test is not registered but the cause of stopping can be displayed in the visualization screen of the test result (refer to the section 2.6.3 page 2-38).

6.4.11.“Cooling unit temperature safety”

This alarm is triggered if the cooling unit is above 48°C. A new test can not be started; A test currently running is stopped if the cooling stage is not finished.

6.4.12. “Cooling unit stroke control safety”

A new test can not be started; A test currently running is stopped if the cooling stage is not finished.

Contact ISL Customer Service.

6.4.13.“Cooling unit board link safety”

This alarm is triggered if no dialogue is detected with cooling unit control board. A test currently running is stopped and a new test can not be started.

6.4.14. “Check the changer and loader”

This failure is signaled when a blocking is detected at the level with the changer or the loader.

This failure does not stop a test currently running but it stops a test if it is signaled during the sample loading in the test module.

6.4.15.“Run down by a power down”

This failure is signaled when the analyzer is switched on again after a power down has stopped a test currently running. The test is canceled. The result is not registered in the result stock but the cause of stopping can be displayed in the visualization screen of the test result (refer to the section 2.6.3 page 2-38).

According to the configuration of the “ReStart” internal parameter (see section 7.2 page 3-58), the analyzer will automatically continue the sample tests loaded in the changer when it will be made alive again or it will stop waiting for the operator presses the **RESTART** key (refer to the section 2.7 page 2-39)

6.4.16.“Leak Detected, Check the sample”

This failure is signaled during a pour point test if the pressure change is not sufficient whereas the temperature decreases. The test is canceled and it is not registered but the cause of stopping can be displayed in the visualization screen of a test result in the changer (refer to the section 2.6.3 page 2-38).

6.4.17.“Run stopped by the operator”

This message is displayed as alarm: when a test is stopped by the operator, this test is not registered but the cause of stopping can be displayed in the visualization screen of the test result (refer to the section 2.6.3 page 2-38).

6.5.Warning alarms

6.5.1.“End of test”

The cloud and/or the pour point of the sample tested is/are defined. The result is displayed and stored in the analyzer memory.
This alarm signals the end of test, i.e., when the sample, reheated, has reached 15°C. Then a new test will be able to start. The alarm is stopped each time a test is run.

6.5.2.“Buzzer modulation setup”

Alarm displayed during the audio alarm test after modulation setting (refer to the section 7.3 - Configuration of alarms: the "Alarms" menu page 3-59 of the current part).

6.6.Alarm Review

The MPP 5Gs can register up to 16 alarm messages.
Activate the ***Review*** menu from the alarm-displaying screen (see Figure 28 page 3-53), the following screens appear:

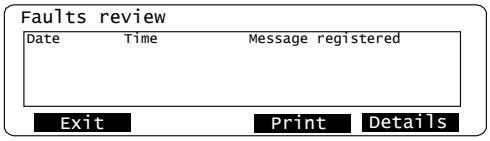
Display (***Review*** menu of the alarm display)	**Meaning of different menus** (Going from left to right and from top to bottom).
	***Exit:*** Going back to the alarms displaying screen ***Print:*** Printing the complete alarms review ***Details:*** Displaying the detailed alarm message
Display 1 of the ***Review*** menu	
Press the **DETAILS** key to access to the detail displaying screen of the alarm selected:	
	Next Display
	Date: Date at which the failure occurs *Src:* State of the analyzer when the failure occurred (idle, run, diagnostic …) *Def:* Alarm message displayed ***Exit***: Going back to the alarm displaying screen
Details display of the ***Review*** menu	

*Table 3: Screens of the **Review*** menu of the alarms displaying screen

7.Configuration: the "Setup" menu

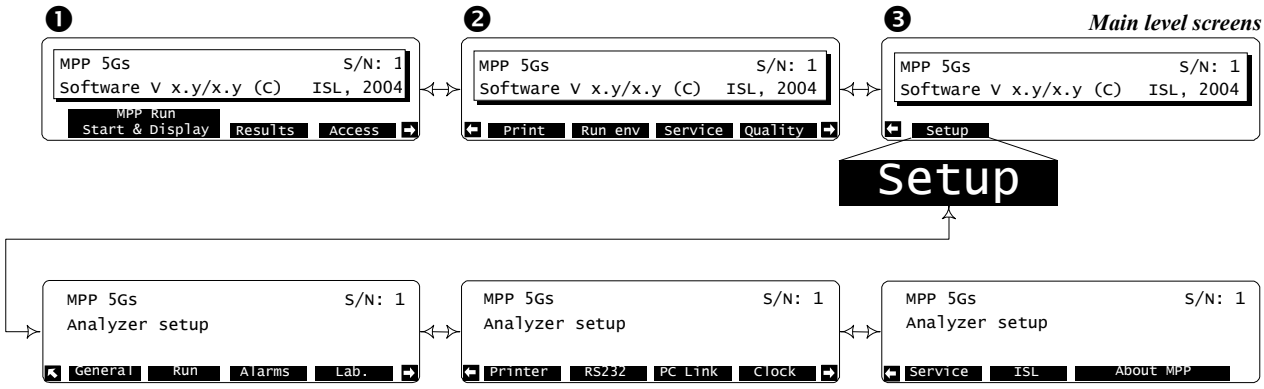


Diagram 6: Setup menu

The MPP 5Gs "working environment" can be completely configured. Thus the testing product in place when the analyzer is switched on can be re-set. The triggering or stopping of an alarm can also be set for when a given error occurs and in other conditions set out below as RS 232C PC link and Alan® local network.

The configuration of the MPP 5Gs is carried out by means of the ***Setup*** menu of the main screens level (see Diagram 6 above). After the ***Setup*** menu is activated the following displays appear:

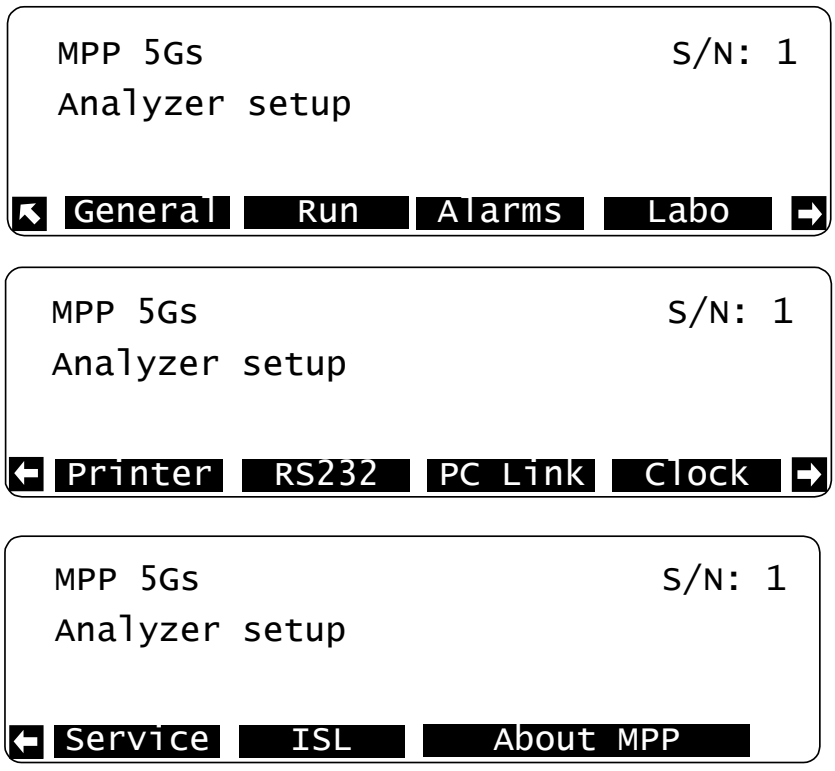


*Figure 29: Displays of the **Setup** menu.*

The above displays allow access to the configuration parameters set out below.

7.1.Power on parameters: the "General" menu

The ***General*** menu allows choosing the access level and the language (if you would like to lock it) in place when the analyzer is switched on.
It also allows configuring (or deactivating) the assisted edition: the MPP 5Gs can proposes a suite to the characters entered based on prior entries (refer to the section 2.5.4.2 page 2-36).

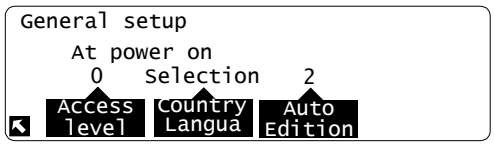
Display (***General*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***General*** menu display	***Access level***: Configuration of the default access level at the analyzer switching on. ☞ ***: It should be noted that only the current access level or lower access level could be chosen.*** ***Country language***: Configuration of the language selected by default (locked). "Selection" mode allows the operator to choose the language. ***Auto Edition***: Keyboarding of the number of characters needed to activate the auto edition (0 inhibits the function).	0 → 3 Selection/English/ Français 0 → 9
Press the **ACCESS LEVEL** key or the **AUTO EDITION** key then enter a value with the **NUMERIC KEYPAD**. Press the **ENTER** key to confirm. Press the **LANGUAGE** key to scroll through the various possibilities (flip-flop selection).		

*Table 4: **General** menu displays*

7.2.Run parameters: the "Run" menu

The ***Run*** menu allows choosing the product in place when the analyzer is switched on.

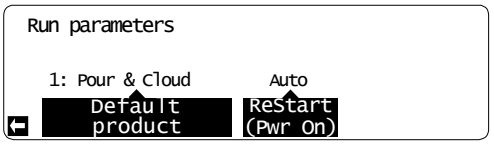
Display (***Run*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Run*** menu display	***Default Product***: Configuration of the product proposed by default when a new sample is loaded ***ReStart***: Configuration of the analyzer behavior when it is switched on again after a power down during a test series	1 → 40 Auto/Manu
Default product: Press the **DEFAULT PRODUCT** key, this calls up the product list. Select the product required then press the **OK** key to validate. The display automatically returns to the ***Run*** menu display. ***ReStart (Pwr On):*** In case of power down, the analyzer stops the test currently running and: ➢ Continues its test series if the parameter is set on "Auto" ➢ Breaks off. It waits for the restarting order of the operator before continuing its test series (refer to the section 2.7 page 2-39).		

*Table 5: **Run parameters** menu displays.*

7.3.Configuration of alarms: the "Alarms" menu

The ***Alarms*** menu allows configuring thresholds of different alarms triggered in case of failure. This menu also allows warning alarm buzzer modulation to be setup.
Activation of this menu calls up the following displays:

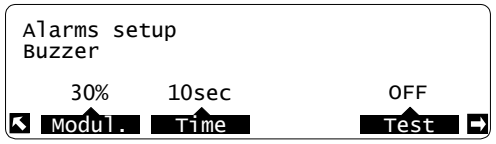
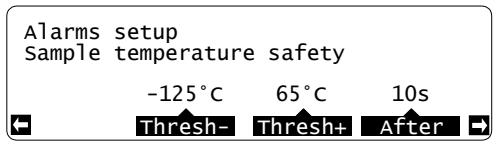
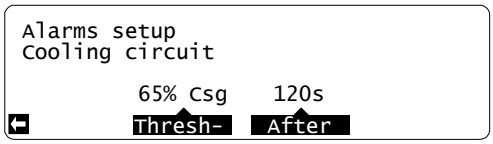
Display (***Alarms*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Alarms*** menu display 1	***Modulation:*** Adjustment of the intermittence of the warning alarm ***Time:*** Keyboarding of the time of the warning alarm ***Test:*** Starting of the buzzer to test the modulation of the warning alarm	0 → 100 2 → 999 s ON/OFF
Modul.: Press the **MODULATION** button then enter the new value (100%: continuous alarm - 0%: alarm mute). ***Time***: The 999 value inhibits the warning alarm temporizing: the operator will have to move to acknowledge the alarm. ***Test:*** Use the **TEST** button to test the buzzer after modifying its modulation.		
		Next Display
 ***Alarms*** menu display 2	***Thresh -:*** Keyboarding of the lower sample temperature the system accepts ***Thresh +:*** Keyboarding of the upper safety temperature the system accepts (alarm triggered after a recognition time) ***After:*** Keyboarding of the recognition time before upper threshold to be taken account	-150°C→65°C -150°C→65°C 0→120s
		Next Display
 ***Alarms*** menu display 3	***Thresh -*** : Keyboarding of the minimal cooling rate in cooling stage ***After*** : Setting of the recognition time before the threshold- to be taken account	-1°C/min → -10°C/min 0 à 120s

*Table 6: **Alarm** menu screens*

7.4.Personalization and access authorization to level 1: the "Lab." menu

The MPP 5Gs can be personalized and so bear the name of the laboratory that acquires it, together with the name of the head of the laboratory. He or she can restrict access to certain parameters (write protected). The following displays can be called up by activating the ***Lab.*** menu.

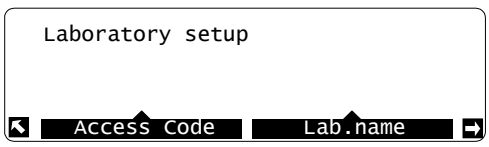
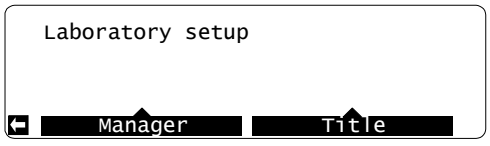
Display (***Lab.*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Lab.*** menu display 1	***Access Code***: Keyboarding of the access code to level 1 ***Lab Name*** : Keyboarding of the name of the laboratory using the MPP 5Gs	Up to 6 characters String
		Next Display
 ***Lab.*** menu display 2	***Manager***: Keyboarding of the name of the laboratory manager ***Title***: Keyboarding of the title of the laboratory manager	String String

*Table 7: **Lab.** menu displays*

7.5.Printer configuration: the "Printer" menu

The printings and printer configuration can be carried out by means of:

- The ***Setup*** menu of the ***Printer*** menu (screen 2 of the main screens level, see Diagram 5 above).
- The ***Printer*** menu of the ***Setup*** menu (screen 3 of the main screens level).

Printer configuration has been dealt with in chapter 5 - Printing and printer setup: The “Print” menu page 3-51 of the current part.

7.6.MPP 5GS ⇔ PC link: the "PC Link" and "RS232" menus

The MPP 5Gs is an « open » device in more than one respect. Not only it is fully user-definable but it can also communicate with a PC through the following facilities (rear panel of the analyzer, see Picture 3 page 1-21):

- The RS 232C link (connection of the Input/Output ports of the Alan® network with the adapter supplied, refer to the section 4.3.3.2 page 1-21)
- The RS485 link (connection to the Alan® network)
- The Service port (“Service” connector at the rear of the analyzer)

Each of these communication modes is specialized as follows:

- The RS 232C link enables the MPP 5Gs to send among others test results in ASCII code to a PC or any other computer system (LIMS for example).
- The RS485 link enables the MPP 5Gs to be connected to the ISL Alan® network (refer to the section 4.3.3.1 page 1-20).
- The Service port enables the control software or the memory content to be updated by downloading and the memory content to be saved by uploading (refer to the section 4.4 - File upload / download command: ***the*** “ISL ***UDS"*** menu page 4-75).

Parameters relating to the RS 232C and the RS485 communication modes are explained below.

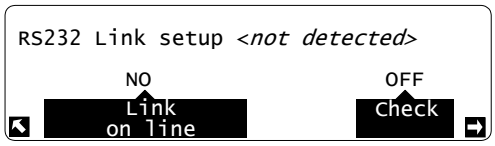
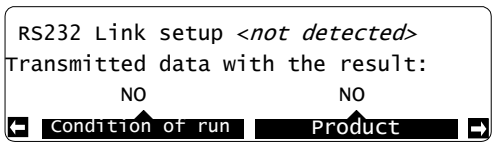
7.6.1.RS232C link setup: the "RS232" menu

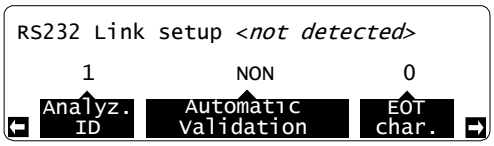
If the RS 232C link is selected as means of communication mode you will first need the appropriate adapter shipped with the analyzer (see the packing list). This adapter has two RS485 connectors on one side which must both be connected to the Input/Output ports of the Analyzer’s Alan® network and an RS 232C connector on the other side, which is connected to the PC (refer to the section 4.3.3.2 page 1-21 for more explanations).

When the adapter has been connected, the analyzer automatically detects the presence of an RS 232C link. Then:

- The RS 232C link is declared « in service »
- The RS485 link (Alan®) is declared « out of service »

Parameters of this link are presented in the table below:

Display (***RS232*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***RS232*** menu display 1	***Link on line***: Link established ***Check*** : Sending a link control raster : <(ISL MPP 5G)ES>	Yes/No ON/OFF
Press the **LINK ON LINE** key or the **CHECK** key to scroll through the various possibilities (Flip-flop selection).		
		Next Display
 ***RS232*** menu display 2	***Condition of run***: Transmission of the test context (e.g. operator name, product parameters and name…) ***Product*** : Transmission of the run parameters of the product selected to carry out the test	YES/NO YES/NO
		Next Display

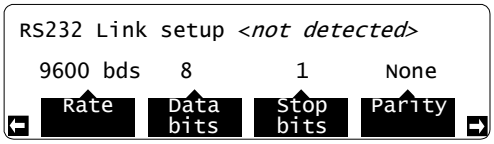


RS232 menu display 3

	Analyzer ID: Keyboarding of the analyzer identification	1→31
	Automatic validation: Automatic transmission of the results at the end of the test	YES/NO
	EOT char.: Keyboarding of the end of transmission character (ASCII code)	String

Press the **ANALYZER ID** key or the **EOT CHARACTER** key then enter a value with the **NUMERIC KEYPAD**. Press the **ENTER** key to confirm.
Press the **AUTOMATIC VALIDATION** key to scroll through the various possibilities (Flip-flop selection).

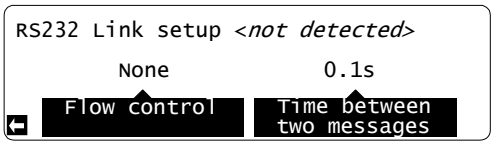
Next Display



RS232 menu display 4

	Rate: Keyboarding of the transfer rate (in baud)	9600 bds
	Data bits: Keyboarding of the number of the data bit	7/8
	Stop bits: Keyboarding of the number of the stop bit	1/2
	Parity: Selection of the type of the parity	None/Even/ Odd

Next Display



RS232 menu display 5

	Flow control: Selection of the type of flow control	None RTS/CTS Xon/Xoff ENQ/ACK
	Time between two messages: Keyboarding of the time between two messages (when there is no transfer protocol)	0 →10s

*Table 8: RS **232** menu displays*

The result messages including the product (if it is selected, move on to screen 2 of the RS232 menu in the table above) are transmitted in the form of a character string in ASCII code (refer to the APPENDIX B - page 87 for the meaning of the content of the messages).

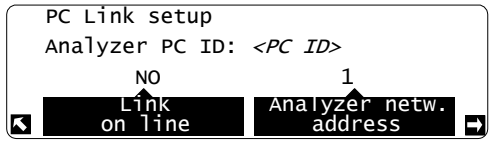
7.6.2.Alan® link setup: the "PC link" menu

When the Input and Output ports of the Alan® network link interface are connected, the unit automatically detects the presence of the local network link.

Note: The MPP 5Gs has been designed to run under ALAN® management software developed by ISL (refer to the section 4.3.3.1 - RS485 serial link – Connection to the ALAN® Network page 1-20).

The parameters of this link are presented and fixed in the table opposite:

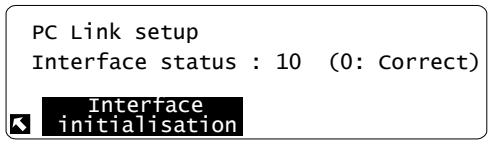
Display (***PC Link*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Analyzer PC ID: Identifying name of the PC on the Alan network.	
	Link on line: Configuration of the state of the link between the MPP 5Gs and the PC	Yes/No
	Analyzer netw. Address : Keyboarding of the MPP 5Gs address on the Alan network	1 → 31



PC Link *menu display 1*

Next Display

Interface status: Possible error code linked to the MPP 5G⇔PC interface. ***Interface initialization***: Initialization of the MPP 5G⇔PC interface	



PC Link *menu* display 2

*Table 9: **PC Link** menu displays*

7.7.Date/Time setting: the "Clock" menu

The date and time are set by means of the ***Clock***. menu. It is possible to change the date format according to the country in which the MPP 5Gs is being used.
When the ***Clock*** menu is activated the following display appears:

Display (***Clock*** menu of the ***Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
Adjust Date/Time JJ-MM-AAAA 01-01-1999 Date format Date ***Clock*** menu display 1	***Date format*** : Selection of the format of the date ***Date*** : Keyboarding of the date in the format selected	JJ-MM-AA MM-JJ-AA AA-MM-JJ AA-JJ-MM JJ-MM-AAAA MM-JJ-AAAA AAAA-MM-JJ AAAA-JJ-MM
Press the **DATE FORMAT** key to make scrolling the various possibilities (Flip-flop selection). Press the **DATE** key to enter the date using the **NUMERIC KEYPAD**. Validate with **ENTER** key.		
		Next Display
Adjust Date/Time 24 hours 15-45 PM Time format Hours AM/PM ***Clock*** menu display 2	***Time format*** : Selection of the format of the hour ***Hours:*** Keyboarding of the hour ***AM/PM*** : Setting the hour (in the case of a 12-hour clock format)	(12/24)h hh-mn AM / PM

*Table 10: **Clock** menu displays*

7.8.The "Service" menu

The ***Service*** menu of the main ***Setup*** menu is used for analyzer service and it requires a level 2 access authorization. It includes sub-menus from which you can enter or modify the analyzer's internal parameters (notably the level 2 access code).
This menu also comprises commands for software updating and memory content resetting / downloading / uploading (data transfer from or to a PC).
The ***Service*** menu of the main ***Setup*** menu is explained in the chapter 4 – "The "Service" menu of the "Setup" main menu" page 4-74.

7.9.The "*ISL*" menu

A level 3 access authorization is required to access to this menu. It is for use by ISL only.

7.10.The About MPP 5Gs menu

The ***Station Version*** menu lets you access various items of information about your MPP 5Gs analyzer:

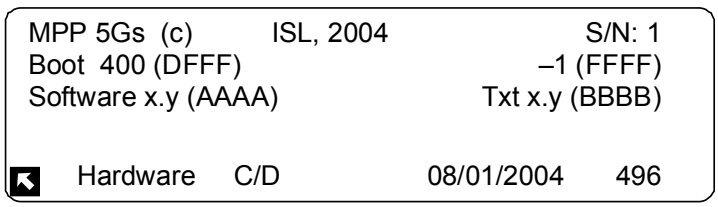


Figure 30: "About NCK2 5G" screen

This menu supplies the following information (from left to right and from top to bottom):

- The name of the unit, the creation year of this analyzer type and the serial number of this unit
- The bootstrap software version and checksum value, the optional bootstrap software version and checksum value
- The program software version and checksum value then the text software version and checksum value
- The unit driver card version / the CPU EPLD version
- The date of the first test
- The total number of tests carried out

The hardware and software version numbers are always indicated on the bottom line of the list of internal parameters supplied with the analyzer.

8.Access levels and password: the "Access" menu

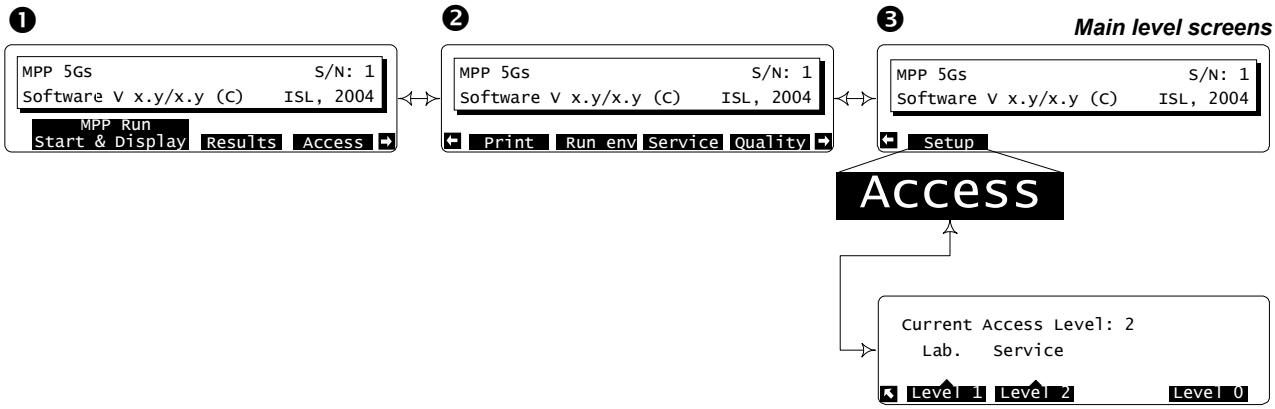


Diagram 7: The Access menu

If entry to a protected level is attempted, the following message is displayed, indicating the current level and the access level requested.

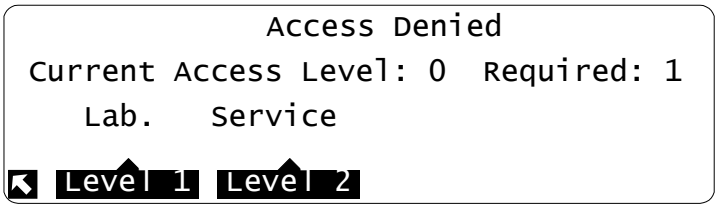


Figure 31: Access to level refused message, indicating that the level is written protected

Two buttons**, LEVEL 1** and **LEVEL 2** allow keyboarding the access codes enabling the required level to be accessed (refer to the section 7.2 page 1-26).

Likewise, the display of the ***Access*** menu of the main screens level (Diagram 7 above) shown below, enables access to a given level or, if necessary, to zero level. Press the **ACCESS** key, the following screen appears:

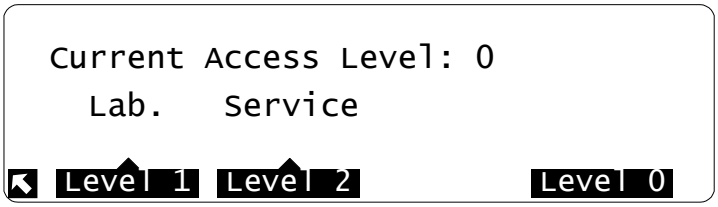


Figure 32: Access menu display

The (digital) access code is entered through the **NUMERIC KEYPAD**. If the code is correct, access is achieved by validation with the **ENTER** key.

The level 1 and 2 access codes are factory set at 0. To enter a new access code, the old access code must be entered first:

For the definition of the access code for level:

- 1: Laboratory level, use the ***Lab./Setup*** menu ; Refer to the section 7.4 page 3-59.
- 2: Service level, use the ***Service/Setup*** menu ; Refer to the Table 17 page 4-74.

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Part 4　Maintenance of the MPP 5Gs

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1.Measurement and diagnostic: the "Service" menu

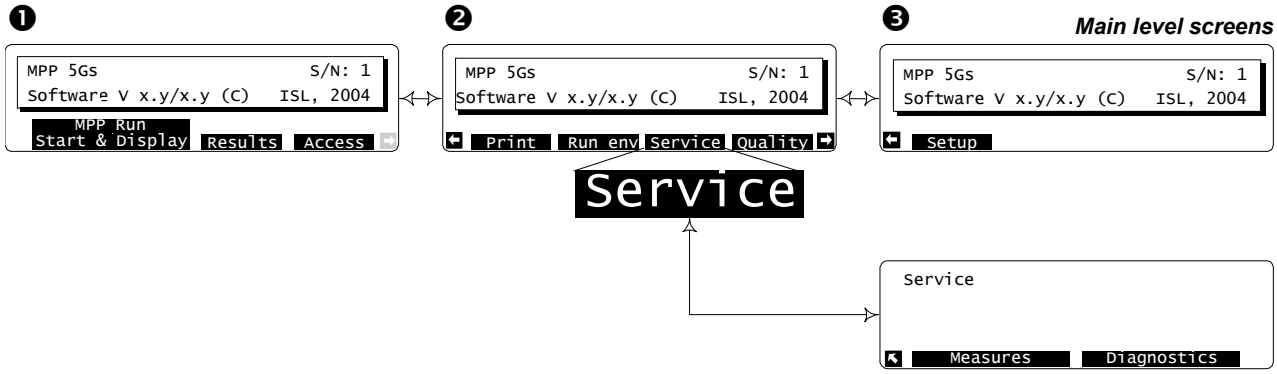


Diagram 8: The Service menu

The ***Service*** menu is in great part dedicated to the analyzer service. With this menu it is possible to:

- Display measures.
- Slave the main parts of the analyzer.

Activating the ***Service*** menu calls up the following display:

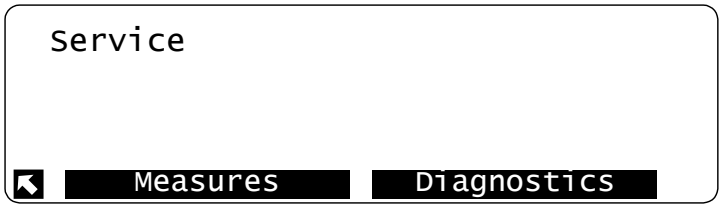


Figure 33: Service menu displays

1.1.Measurement displaying on the analyzer: the "*Measures*" menu

The ***Measures*** menu (in the ***Service*** menu) gives access to the following information:

Display (***Measures*** menu of the ***Service*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).
Smp.:20.7°C 0.1°c/min 108.11Ω 47170 Rec: 310 Emt: 0 Prs: -70 Cooling unit: 0 Heat.: 0 00000000 0.0% 0.0% Print Flags: 01000001 ***Measures*** menu screen	***Smp.*** : Sample temperature (°C); variation rate in temperature (reheating or cooling); resistance of sample probe (Ω); analog/digital conversion value ***Rec:*** Number of points on the receiving signal of the cloud point detection system ***Prs:*** pressure measured in the cell ***Emt:*** Number of points on the sending out signal of the cloud point system ***Cooling unit***: 0 - Effective number of points applied to the cooling unit (information given back by the compressor control board) and below the state indicator of the cooling unit (refer to the Table 12 page 4-68) 0.0%: Power requested in percentage sent to the cooling compressor control board ***Heat***: 0 - Effective number of points applied to the heating (information given back by the control board) 0.0%: Power requested in percentage sent to the heating control board ***Flags:*** State indicator of the sample changer mechanism (refer to the Table 13 page 4-68) ***Print*** : Printing of measures

*Table 11: **Measures** menu displays*

Cooling unit state indicator

Bit N°	Significance of the bits 7 ….. 0
7	Reserved
6	1 = Maximum current (8.5 A)
5	Reserved
4	1 = Temperature of the cooling unit > 48°C
3	1 = Cooling unit fan ON / 0 = OFF
2	Reserved
1	Reserved
0	Reserved

Table 12: Significance of the state indicator binary message of the cooling unit

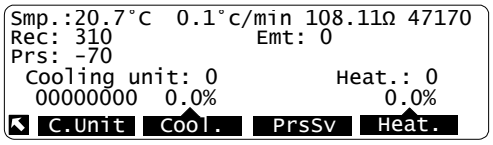
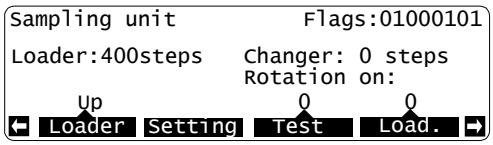
Sample changer mechanism state Indicator

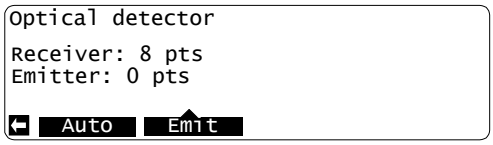
Bit N°	Significance of the bits 7 ….. 0	State
7	Reserved	
6	Reserved	
5	Stopper detector	1 = stopper detected
4	Vial detector	1 = vial detected
3	Changer revolution control	0 = cavity, 1 = cog facing the detector
2	Changer displacement control	0 = full, 1 = cavity facing the detector
1	Changer zone	1 = changer in low zone
0	High and low stroke	1 = in high or low stroke

Table 13: Significance of the state indicator binary message of the sample changer mechanism

1.2.Diagnostic aid: the "*Diagnostics"* menu

The ***Diagnostics*** menu of the ***Service*** menu can only be accessed by users with the level 2 access authorization (service). This menu allows the various MPP 5Gs power consuming devices to be slaved such as the cooling compressor, the test module or the heating for the good operation to be verified.
Activate the ***Diagnostic*** key of the ***Service*** menu gives access to the screens below:

Display (***Diagnostic*** menu of the ***Service*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
 ***Diagnostic*** menu display 1	Refer to the previous section 1.1 page 4-67 for explanations on the various information fields of the screen upper part. ***C.Unit:*** Access to the cooling unit diagnostic menu (refer to the next section) ***Cool*** : Keyboarding of the power requested to the cooling compressor control board in percentage ***PrsSv.***: Control of the overpressure safety solenoid valve ***Heat*** : Keyboarding of the power requested on the heating control board in percentage	
C.Unit: Activate the ***C.Unit*** menu allows launching the diagnostic procedure of the cooling compressor (refer to the next section). ***PrsSv:*** 1 pressure on the control key induces 2 opening/closing successive cycles of the overpressure safety solenoid valve.		
Next Display		
 ***Diagnostic*** menu display 2	***Flags*** : State indicator of the sample changer mechanism (refer to the Table 13 page 4-68) ***Loader:*** Control of the sample loader (loading/unloading of the sample in the test module) ***Setting:*** Adjustment of the high and low position of the loader ***Test:*** Revolution of the changer – Keyboarding of the number of the place to position in front of the loader ***Load.:*** Revolution of the changer – Keyboarding of the number of the place to position in front of the sample loading area in the changer	
The adjustment of the sample loader in the test module must be performed by a qualified technician following a specific procedure. ***Note it is impossible to work the loader if the test module is <12°C.***		
Next Display		

 ***Diagnostic*** menu display 3	***Auto:*** Automatic enslavement of the emitter to obtain a given number of points on the receiver (≈37500 points) ***Emit:*** Control of the optical emitter (keyboarding of the number of points to emit)	0 → 4095 pts (emission max.) 0 → 4095 pts

Automatic enslavement of the optical detector :

Note: Values given in the procedure described below are for a clear product.

1. Load a sample of a clear product in the changer.
   - Press the **LOAD** key of the ***Diagnostic*** menu screen 2 then enter a free location number.
   - Press the **ENTER** key on the keyboard.
   - Position a sample in the changer.
2. Press the **TEST** key of the ***Diagnostic*** menu screen 2 then press **ENTER** to position the loaded sample above the detection cell.
3. Press the **LOADER** key to load the sample in the test cell.
4. When the sample is placed in the cell, press the **AUTO** key of the ***Diagnostic*** menu screen 3 to start automatic enslavement. Let the value stabilizes; the value obtained has to be lower than 3000 pts on the emitter for about 37500 pts on the receiver.
5. Press the **LOADER** key again to unload the sample from the detection cell.
6. Press the **LOAD** key again to unload the sample from the changer.

If the obtained values do not correspond to the expected values, call for a qualified technician to check the detection cell operation.

*Table 14: **Diagnostics** menu displays of the **Service** menu*

1.3.Cooling compressor diagnostic

Diagnostics has three stages:

1. Initialization: heating to 40°C and regulation for 3 min
2. Cooling: cooling up to –110°C during 60-min max. During this stage the values of temperatures to note are taken (time required to fall to each notable temperature and effective number of points at this same temperature)
3. Reheating: return to ambient temperature

The ***Print*** button allows a printout to be made of the cooling compressor parameters (plus the values noted during stage two – see above) which can, if necessary, be sent to ISL's Customer Service for the compressor's condition to be checked. Refer to the APPENDIX A - section 6 - Internal parameter print page appendix 86 for a printing example of these parameters.

The following table explains the cooling unit diagnostic procedure to follow:

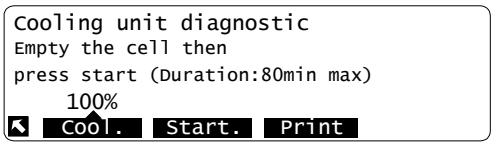
Display (***Cooling Unit*** menu of the ***Diagnostic*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).
 ***C. Unit*** menu display	***Cool.***: button for Keyboarding the cooling percentage required (100% by default) ***Start***: menu for running the diagnostic procedure ***Print*** : printing cooling compressor parameters stored during the last diagnostic

*Table 15: **C. Unit** menu display of the **Diagnostic** menu*

2.Adjustment: the "Quality" menu

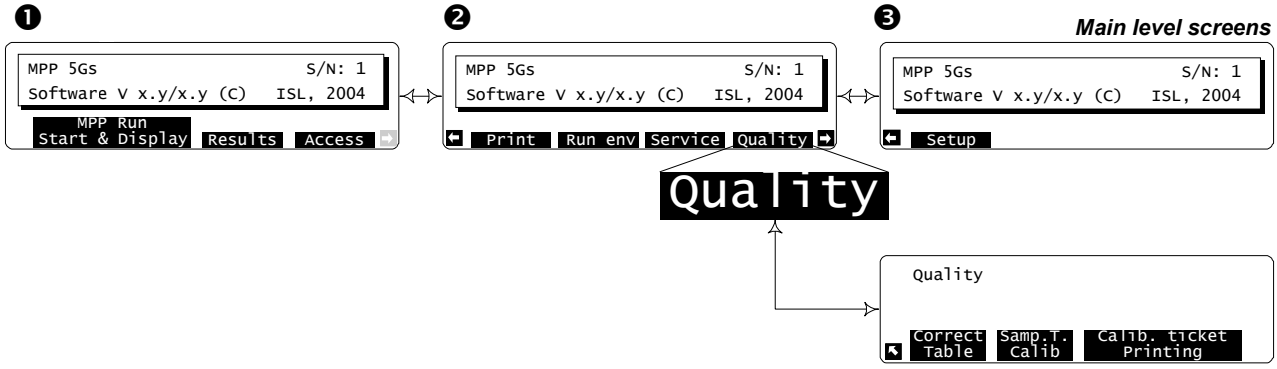


Diagram 9: The Quality menu

The MPP 5Gs measurement instrumentation sometimes requires calibration. How often depends on the user, but it is recommended that all the measurement instruments be adjusted at least once a year. The ***Quality*** menu has a series of menus dealing with the following adjustments; these are grouped in the display below:

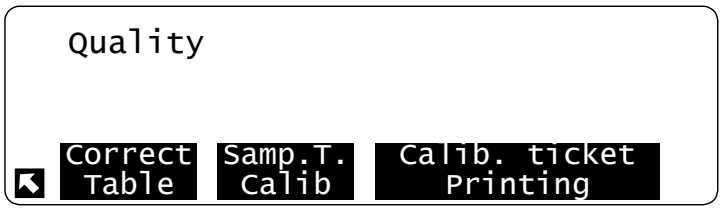


Figure 34: Quality menu display

- The "***Correct Table***" menu: sample temperature measurement probe correction table.
- The "***Samp. T. Calib***" menu: calibration of sample temperature measurement probe. .

Adjustments carried out in this way can be printed out using the ***Calib. ticket Printing*** menu.

2.1.Sample probe correction table: the "Correct Table" menu

The ***Correct Table*** menu makes it possible to enter a correction table for the sample temperature measurement probe. The sample temperature displayed takes this table into account (during tests only).
On activating the ***Correct Table*** menu the following display appears:

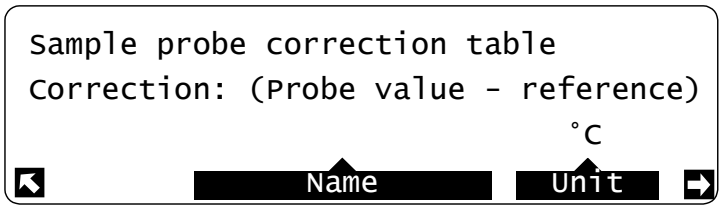


Figure 35: Correct Table menu Display 1

This display allows the name of the correction table to be entered and the table's unit of temperature to be selected.

On a series of displays similar to the display below the correction values can be entered (correction value = value indicated by the probe – reference value), for temperatures from -100°C (-148°F) to +90°C (194°F) (with an increment of 10°C):

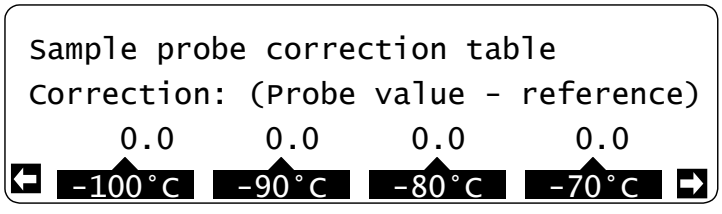


Figure 36: Correct Table menu Display 2

2.2.Adjustment of sample temperature measurement circuit: the "Samp. T. Calib." menu

Adjustment of the sample temperature measurement circuit is done through the ***Samp.T. Calib***. menu of the ***Quality*** menu.

2.2.1.Tools required

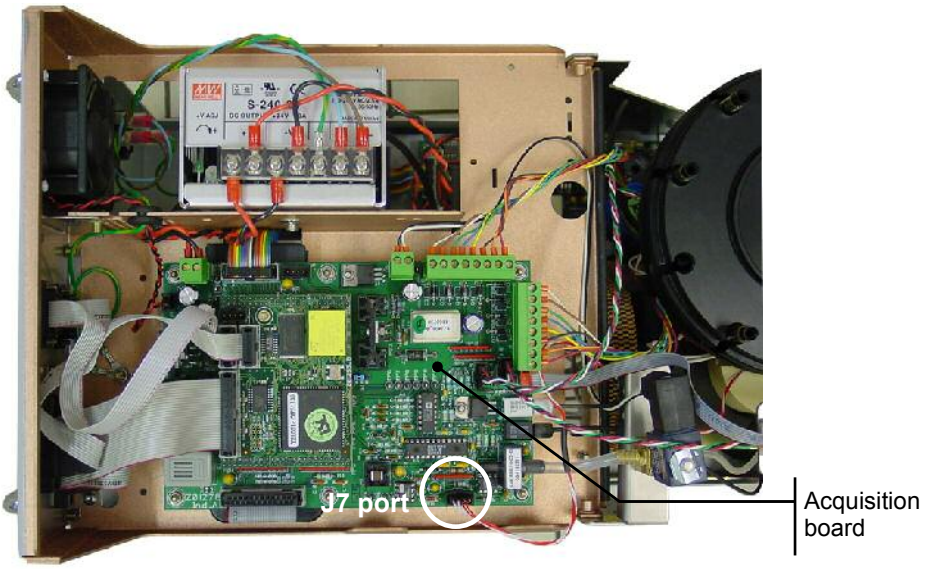
- A small flat screwdriver
- An Allen® key set
- The PS100 ISL temperature check box

2.2.2.Procedure

1. Switch off the analyzer.
2. Remove the analyzer's cover. For this, remove the two screws in bottom corners each side of the cover.

Caution! Switch off the analyzer and disconnect it from the mains.
Adjustment of the temperature measurement circuit requires switching on the analyzer, switch it off again before connecting or disconnecting any electrical component.

3. Locate the (J7) connection port on the Acquisition board:



4. Disconnect the sample temperature probe from the connection port (J7). Use a small flat-bladed screwdriver to move the small locking pin.

The connector and wires of the probe are extremely fragile. Connection and disconnection must be made with extreme care.

5. Connect the probe simulator connector to the free connection of the (J7) port.
6. Power on the analyzer.

Turn the analyzer on for at least 30 minutes to allow the electronics to warm-up and stabilize.

7. Activate the ***Samp.T.Calib.*** menu of the ***Quality*** menu then follow the indications on the displays set out below.

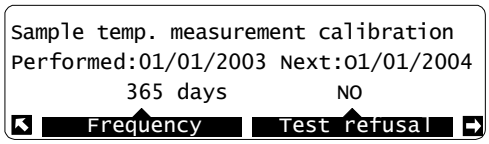
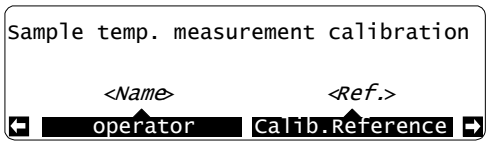
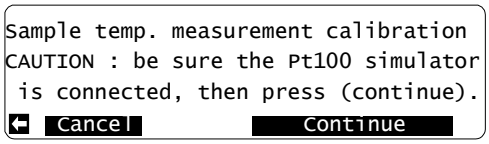
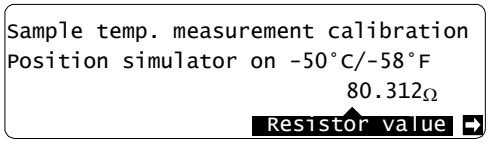
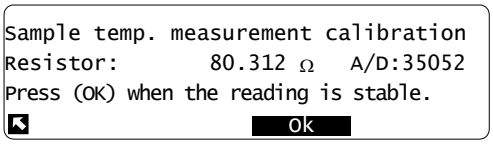
Display (***Sample Temperature Calibration*** menu of the ***Quality*** menu)	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 ***Samp. T. Calib***. menu Display 1	***Frequency***: Keyboarding of the calibration frequency 0 days indicates that there is no check for the passing of the calibration date. ***Test refusal***: Initiation of test denied when date set for calibration passed	0 → 365 days Yes/No
		Next Display
 ***Samp. T. Calib***. menu Display 2	***Operator***: Keyboarding of the name of the operator performing the adjustment ***Calib. Reference***: Keyboarding of the reference of the Pt100 simulator used for the adjustment	String String
		Next Display
 ***Samp. T. Calib***. menu Display 3	***Cancel***: Abandonment of the adjustment; Return to display 1 of ***« Samp. T. Calib »*** menu. ***Continue***: Once calibration has been initiated it is no longer possible to cancel it. The keys on the front panel are disabled.	
		Next Display
 ***Samp. T. Calib***. menu Display 4	Position the Simulator knob at -50°C/-58°F. ***Resistor value***: Keyboarding of the resistance value (Ohm) if necessary	
		Next Display
 ***Samp. T. Calib***. menu Display 5	When the display becomes almost stable (with the first three characters of the A/D conversion stable) validate with ***OK***.	
Proceed similarly with the Simulator knob set on +50°C/122°F. At the end of operation display 1 of the ***Quality*** is displayed.		

Table 16: **Samp. T. Calib.** *menu displays*

At the end of the adjustment procedure:

1. Power off the analyzer.
2. Disconnect carefully the probe simulator connector from the (J10) port, and then reconnect the sampling temperature sensor.
3. Replace the protective cover and fix it with the four screws.

3.The "Service" menu of the main printing menu

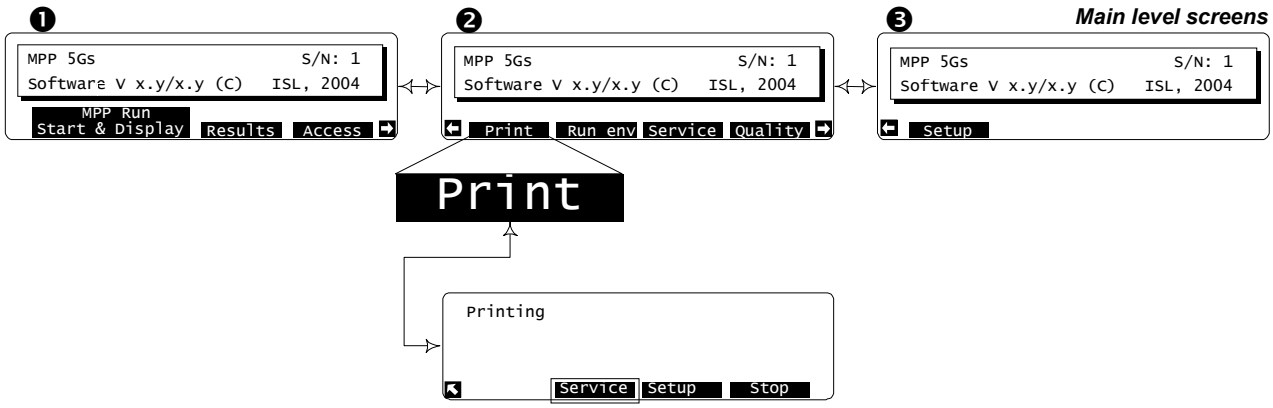


*Diagram 10: The **Print** menu*

The ***Service*** menu of the main printing menu is dedicated to analyzer service and it requires a level 2-access authorization. Actually, collect the regulation data linked to the analyzer functions and print them enables a diagnostic to be made easier. Data can also be stored in a PC file.
Activate the ***Service*** menu of the ***Print*** menu, the following screen is displayed:

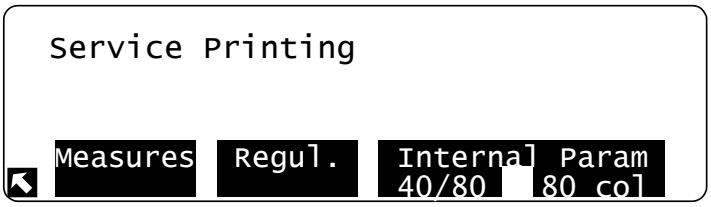


*Figure 37: **Service** menu of the main printing menu*

The ***Service*** menu of the main printing menu contains the following buttons:

- ***Measures***: Printing of the values measured by the different MPP 5Gs sensors (refer to the section 1.1 page 4-67). See APPENDIX A - chapter 5 - page appendix 85 for a printing example.
- ***Regulation***: Regulation monitoring feature – analyzer internal measures printing each seconds
- ***Internal parameters***: Printing of the analyzer internal parameters (setup parameters, run parameters and setting values)
  - **40/80** key: This feature enables the internal parameters to be printed out according to the printer setup (40 or 80 columns)
  - **80** key: This feature enables the internal parameters to be printed out in 80 columns whatever the printer setup may be.

3.1.Regulation monitoring

The ***Regul.*** menu enables all regulation data linked to the analyzer devices to be collected and transmitted to a printer or other peripheral (PC or LIMS). These data are read each second during the entire test.
To do so enables a diagnosis to be made easier.

3.2.Internal parameters

A number of internal parameters are stored in the non-volatile memory. They are controlled by the microprocessor with a code checksum stored in the memory.
These internal parameters relate to:

- Setting values
- Setup values
- The Analyzer identifying

One of the first operations we recommend on receiving your analyzer or before any modification is to print out all service parameters. Keep this list to resort to it in case of problem.
Refer to the APPENDIX A - section 6 - page appendix 86 for a printing out example of the analyzer internal parameters. A copy of the service parameters is also delivered with the analyzer MPP 5Gs, but it should be kept safe by the person in charge of the laboratory.

4.The "Service" menu of the "Setup" main menu

The ***Service*** menu of the main ***Configuration*** menu is mainly dedicated to the analyzer service and it requires having a level 2 access authorization (the ***Setup*** menu is explained in Part 3).

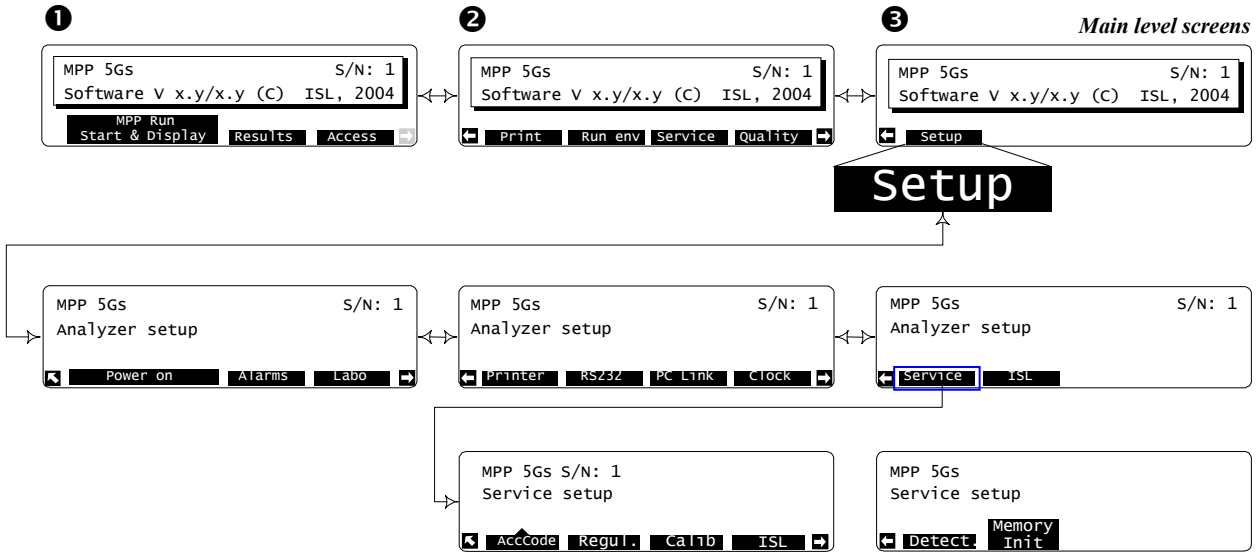


Diagram 11: : Setup menu

The ***Service*** menu of the main ***Configuration*** menu contains menus with which the level 2 access code can be configured (service level), regulation parameters can be entered and setting values and optical detection instrument parameters can be modified.
Regulation parameters and setting values are part of internal parameters. They can be directly entered in this menu but it should be avoided modifying them without the ISL authorization. This could question the good working order of the unit.
This menu also groups together commands to update the software, to transfer files to a PC and to delete or backup the NVRam memory.
Activating the ***Service*** menu of the ***Configuration*** menu gives access to two displays:

Display (***Service*** menu of ***Setup*** menu).	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
MPP 5Gs S/N: 1 Service setup AccCode Regul. Calib ISL UDS ***Service.*** menu display 1.	***AccCode*** : Configuration of the level 2 access code (Service level) ***Regul***. : Keyboarding of regulation parameters ***Calib***. : Keyboarding of setting values, e.g. sample temperature probe ***ISL UDS***: Access to the menu for software downloading and data transfer to a PC.	-32768 → 32767
		Next Display
MPP 5Gs S/N: 1 Service setup Detect. Memory Init ***Service*** menu display 2	***Detect***: Keyboarding of optical detection parameters ***Memory init:*** Access to the deleting or initialization menu for the NVRam memory storage areas: ➢**RESULTS**: Deleting the results stored ➢**PRODUCT** : Deleting the product list ➢**OPER.** : Deleting the operator name list ➢**ALARMS & REVIEW**: alarms initialization (with default values) and deletion of the alarms memorized ➢**SAMPLE PROBE**: Deleting the correction table values of the sample temperature measurement probe	

*Table 17: **Service** menu displays*

4.1.Keyboarding of regulation values: the "Regul." menu

The regulation parameters can be entered directly in the screens of the ***Regul.*** menu (refer to the internal parameters list supplied with the analyzer).

Note: These parameters are factory set and they normally must not be modified.

4.2.Keyboarding of calibration values: the "Calib." menu

If data are lost, the calibration values can be entered directly in the display below, without prior adjustment:

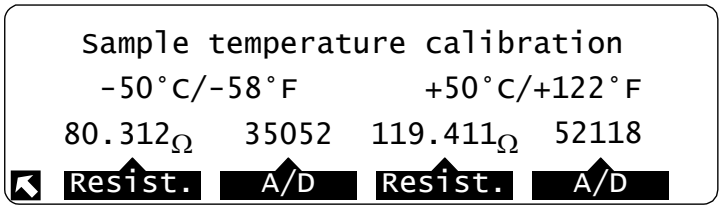


Figure 38: Calib. menu display

Modifying sample temperature adjustment values

High and low reference resistance values are related to the adjustment of the sample temperature. They are calculated by automatic adjustment and do not normally need to be modified. If these values are modified manually this is indicated by an asterisk above the number of the result when it is displayed and printed.

4.3.Keyboarding of detection values: the "Detect." Menu

The detection parameters can be directly entered in the screens of the ***Detect.*** menu (refer to the internal parameters list supplied with the analyzer).

Note: These parameters are factory set and they normally must not be modified.

4.4.File upload / download command: the "*ISL UDS*" menu

The basic analyzer is delivered as standard with the "ISL UDS" PC program for data uploading (backup on a PC) / downloading (from a PC towards the analyzer):

You can download on the analyzer:

- An update of the analyzer software (using an update diskette or from a downloaded file)
- Run environments (parameters of prestored products and operator names)
- The whole content of the Nvm memory (analyzer internal parameters, run environments and results)

You can upload:

- Run environments (parameters of prestored products and operator names)
- The whole content of the memory (analyzer internal parameters, run environments and results)

Downloading / Uploading is made via the analyzer "SERVICE" port at the back of the analyzer (see Picture 3 page 1-21). An external connection cable is standard equipment for data flow between PC and analyzer.

Downloading/Uploading is a function special to this analyzer. The analyzer is in this mode, either:

- by automatic detection of a download request or,
- by an explicit request made by the operator via the analyzer's keyboard.

Once the analyzer is in this mode, it can not be quit using the keyboard: Downloading causes memory loss. If an error is made, it is better to let the downloading continue, and then download again. If the operator stops the analyzer during downloading, the next time the analyzer is powered up it will automatically detect that a transfer is needed.

4.4.1.Transfer procedure

The analyzer goes into download mode either automatically, or requested by the user. It waits for a PC transmission.

When the downloading software is run on the PC, it sends a specific message to the analyzer.

In replying to this message, the analyzer indicates the type of downloading required, followed by a safety sequence. The PC then sends data, which is processed by the analyzer.

When the PC software considers the downloading is finished, it validates this with a signal to the analyzer.

4.4.2.Installation and start-up of the downloading program

See instructions in the ISL UDS software "Read me" file.

4.4.3.Hardware preparation

4.4.3.1.Connection of the analyzer to a PC

- Power down the PC and the analyzer and plug the download cable (see Packing List) into the "SERVICE" port connector at the back of the analyzer, and the serial port of the PC.
- Power up the PC and the analyzer.

4.4.3.2.Analyzer preparation

- Select the ***Setup*** menu from the screen 3 of the main screen level (see Diagram 11 page 4-74).
- Select the ***Service*** menu from the screen 3 of the setup menu.
- Select the ***ISL UDS*** menu from the screen 1 of the service setup menu (refer to the Table 17 page 4-74). Data uploading and downloading commands are accessible from the following screens:

Display (***ISL UDS*** menu of the ***Service Setup*** menu)	**Meaning of different menus** (Going from left to right and from top to bottom).
Upload/Download MPP 5Gs Analyzer software MPP 5Gs software Download ***ISL UDS*** menu screen 1	***MPP 5Gs software download***: Downloading of the control software in the analyzer (code and text) to update it for example.
	Next Display
Upload/Download Internal parameters: Download from PC Upload to PC Run env All ***ISL UDS*** menu screen 2	***Download from***: Data flow <u>from a PC to the analyzer</u> ***PC***: Downloading of a backup file of the analyzer non-volatile memory (the content depends on the command used during the upload, see below) ***Upload to PC***: Data flow <u>from the analyzer to a PC</u> ***Run env***: Backup of the run environments (parameters of prestored products and operator names) ***All***: Backup of the whole content of the NVRAM memory (internal parameters, run environments and results)

Table 18: **ISL UDS** *menu of the* **Service** *setup menu screens*

When the required command of the loading menu is selected, the analyzer is waiting for a transfer. The analyzer displays the type of transfer expected: "*Software download in progress*" for example and the red light of the Alarm **STOP KEY** on the keypad flashes awaiting the software download.

4.4.3.3.PC preparation

When the analyzer is ready and <u>after the required loading command</u> corresponding to the required type of transfer is selected, you can prepare the PC.

- Start the "ISL UDS" transfer software.
- Select the COM port (COM1 by default) corresponding to the serial port of the PC on which the "analyzer/PC" link cable is connected.
- Then select the baud rate. Validate by pressing the *OK* key.
  Note: First select the higher transfer rate then lower it if the transfer does not run correctly ("Option" menu then "Serial port").

4.4.4.Automatic-requested transfer

The analyzer will automatically detect a download request in the following cases:
➢The analyzer screen does not light up: a software download (code + text) failed or have been interrupted.
➢A safe memory failure occurred.
When the analyzer is waiting for a download, the red light of the **ALARM STOP** key on the keypad flashes (every second).

- Power down the PC and the analyzer.
- Prepare the PC and the analyzer (refer to the section 4.4.3 above).
  Note: In case of automatic download request, the analyzer is in software download expected mode by default.
- Power up the PC and the analyzer.
- Start the analyzer software downloading from the PC (refer to the section 4.4.5.1 page 4-77). A download in progress is indicated by rapid flashing of the red light of the **ALARM STOP** key, which is related to the rate of data transfer.

4.4.5.User-requested transfer

4.4.5.1.Updating or reloading of the analyzer software

- Prepare the analyzer and the PC (refer to the section 4.4.3 page 4-76): select the ***MPP 5Gs software download*** menu from the screen 1 of the analyzer ***ISL UDS*** menu. The analyzer screen displays the type of the expected transfer: "*Software download in progress*" and the red LED flashes awaiting the software download.
- Start the download from the PC: select "Connect" in the "Communication" menu. The following message is displayed: "*The analyzer is waiting for program download". Continue?"*. Confirm with "*YES*".
- A prompt menu is opened. Select the information file ISLMPP.Vxx (xx: software version).
- Confirm the transfer by pressing the "*Transfer*" key. The PC first loads the "program" software of the analyzer. This can take a few minutes. When the downloading is completed, the following message is displayed: " *Program download: Transfer completed*". Validate by pressing the "*OK*" key.

  The analyzer software updating also requires transferring the "text" software, this is why when the transfer of the "program" software is completed the analyzer screen remains blank but the red light of the **ALARM STOP** key on the keypad flashes indicating the analyzer waits for the remainder of the transfer.
- Select again "Connect" in the "Communication" menu of the "ISL UDS" PC software. The following message is then displayed: "*The analyzer is waiting for screen texts download". Continue?*". Confirm with "*YES*".
- Select again the information file ISLMPP.Vxx and start the transfer (select "Connect" in the "Communication" menu and proceed as the same).

Note: It is not required to adjust the analyzer measurement circuits when the software is updated.

4.4.5.2.Downloading data (towards the analyzer)

- Prepare the analyzer and the PC (refer to the section 4.4.3 page 4-76): select the ***Download from PC*** menu from the screen 2 of the analyzer ***ISL UDS*** menu. The analyzer screen displays the type of the expected transfer: "*Internal parameters download in progress*" and the red light of the **ALARM STOP** key on the keypad flashes awaiting the software download.
- Start the download from the PC: select "Connect" in the "Communication" menu. The following message is displayed: "*The analyzer is waiting for internal parameters download". Continue?*". Confirm with "*YES*".
- A prompt menu is opened. Select the required file or key in the name (key in the name and the extension of the file): type of data downloaded in the analyzer depends on the content of the backup file selected and so on the command used to perform the backup: run environment backup (.env extension) or the whole of the NVM memory content (.nvm extension; refer to the following section for more explanations).
- Confirm the transfer by pressing the "*Open*" key.
- When the downloading is completed, the following message is displayed on the PC screen: "*Parameters download: Transfer completed".*
- Validate with the "*OK*" key. If the transfer was OK the analyzer is automatically reinitialized.

4.4.5.3.Uploading data (towards the PC)

- Prepare the analyzer and the PC (refer to the section 4.4.3 page 4-76): select the appropriate command of the ***Upload to PC*** menu from the screen 2 of the analyzer ***ISL UDS*** menu:
  - The ***Run env*** menu enables run environment to be saved in view to be reloaded or to be transferred towards one or several analyzers.
  - The ***All*** menu enables the whole content of the Nvm memory to be saved (run environments, results and internal parameters).
- The analyzer screen displays the type of the expected transfer: "*Run environment upload in progress*" or "*Internal parameters upload in progress*" and the red light of the **ALARM STOP** key on the keypad flashes awaiting the software download.
- Start the upload from the PC: select "Connect" in the "Communication" menu. The following message is displayed: "*The analyzer is waiting for internal parameters upload". Continue?*". Confirm with "*YES*".
- A prompt menu is opened. Key in the name (key in the name and the extension of the file).
  - run environment: file1.env
  - all: file2.nvmAnalyzer

Use a new file name for each download (for example, use the date as a name – IPDDMMYY.NVM. Moreover, it will be interesting for the user to identify the type of the file uploaded with its extension name.

- Confirm the transfer by pressing the "*Save*" key.

If the transfer was OK the analyzer is automatically reinitialized.

5.Analyzer Maintenance

5.1.Routine Preventive Maintenance

The ideal time interval for the frequency of controls and preventive maintenance on the analyzer is to determine by the user according to the analyzer environment, its frequency of use and the customer's Quality Assurance Program.

5.1.1.Calibration

MPP 5Gs temperature measuring device need to be verified at intervals of not more than six months or after one of the elements of the circuit has been replaced or repaired. Perform an automatic calibration of the temperature measurement circuit at least once yearly (refer to the section 2.2 page 4-71).

Test a known product to verify results (reliability must be defined: 1 time / 100 tests or once a week).

5.1.2.Data backup

Regular uploading of the internal parameters must be programmed as part of the analyzer maintenance procedure. Use a new filename (e.g. with the current date in the name- PIDDMMYY. NVM). This way the latest version of the internal parameters will be saved to a file (refer to the section 4.4 page 4-75).

5.1.3.Analyzer ventilation holes cleaning

Built-in cooling analyzers comprise a cooling compressor that necessitates several special precautions to be respected for the long life of the analyzer and its optimum performance (refer to the section 3.2 page 1-19).

The optimal operating temperature for the analyzer is around 20°C. To avoid harmful overheating of the unit:

- Keep the rear of the unit clear to allow heat to escape easily.
- Keep the ventilation holes in the side of the unit clear. They must be regularly blown clear of dust to avoid clogging and possible blocking.

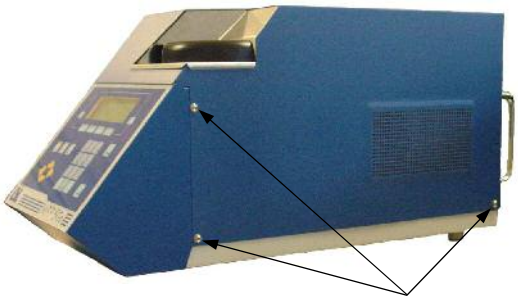
5.2.Internal operation: Analyzer housing cover disassembly

ADVERTISEMENT

CAUTION! Switch the analyzer off and disconnect it from the mains before removing the housing.

If the service operations require you to switch the analyzer on, switch it off again before disconnecting or removing any electrically powered components.

- Switch the analyzer off and disconnect it from the mains.
- Using an Allen® key remove the 3 screws in low corners and behind the screen each side of the analyzer.
- Grip the housing near the top between your two hands and pull towards the top to remove it.

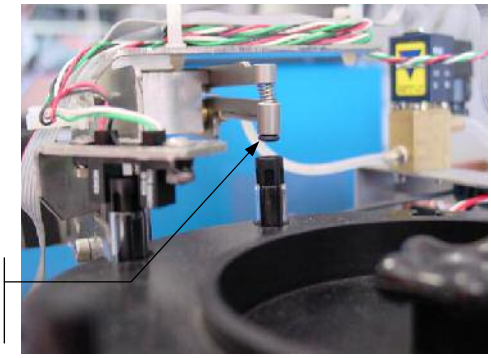


CAUTION! Replace the housing cover before switching on the analyzer.

- Proceed in the reverse order to reassemble the analyzer.

5.3.Replacement of the sealing O-ring of the sample loader arm

- Switch off the analyzer.
- Remove the analyzer housing cover (see section above).
- Using a small flat-bladed screwdriver, extract the sealing O-ring of the sample loader arm and replace it.
- Proceed in the reverse order for the reassembly.
- Perform a pour and cloud test with a known product to check measurements.



Sealing O-ring of the sample loader
M010121-10

6.Troubleshooting Guide

6.1.Frequently Asked Questions

Problem	Solution
When the analyzer is switched on, the LCD screen does not light up. What should I do?	➢If the PMD was stored in a cold or wet place, leave the analyzer in a dry and temperate place for a while before switching on (adapt the time according to the temperatures at which the analyzer has been stored). ➢Verify the backlight setting (refer to the section 6.1.2 page 1-24). ➢Verify the ambient temperature: operating temperatures of the MPP 5Gs: 15°C (59°F) to 35°C (95°F). If the temperature is too low or to high, the text is not visible on the LCD screen even if the supply circuit works. ➢Call for a qualified technician to verify the screen and its power supply circuit.
Within the context of the ISO 9002 Quality Assurance, which controls are recommended on the MPP 5Gs?	➢Perform a calibration of temperature measurement circuit at least once yearly (refer to the section 2.2 page 4-71). ➢Test a known product to verify results (reliability must be defined: 1 time / 100 tests or once a week). ➢Regularly upload analyzer internal parameters (refer to the section 4.4 page 4-75). ➢Remove the dust on the ventilation holes and analyzer sides and back.
In run or in diagnostic: some heating is asked but the sample temperature does not rise or the required temperature is not reached.	➢Call for a qualified technician to verify the power supply circuit of the heating element and its operation.
In run or in diagnostic: some cooling is asked but the sample temperature does not rise or the required temperature is not reached.	➢Call for a qualified technician to verify the power supply circuit of the cooling unit and its operation.

6.2.Failure solution

	Failure alarms	Programmable	Cause(s)	Action(s)
1	“Software memory (PROM)”	No	Firmware programme corrupted	➢Switch off then switch on the analyzer to initialize the memory. ➢If the problem persists, download the programme and code software using the ISL UDS software (refer to the section 4.4 page 4-75) if needed. ➢If the problem persists, call for a qualified technician.
2	“Data memory (Ram)”	No	Memory corrupted	➢Switch off then switch on the analyzer to initialize the Ram memory. ➢If the problem persists, call for a qualified technician.
3	“Safe memory (NVM)”	No	NVRam memory corrupted	➢Acquit the alarm, the analyzer is automatically in download mode. ➢Download the analyzer internal parameters from a PC using the ISL UDS software supplied (refer to the section 4.4 page 4-75) or enter them (see chapter 4 page 4-74). ➢Then perform the calibration of the temperature measurement circuit and enter the sample temperature probe correction values (refer to the chapter 2 page 4-70).

4	“Low battery “	No	Back-up battery discharged	**Do not switch off the analyzer!** ➢Print (see section 3.2 page 4-73) or save (see section 4.4 page 4-75) the analyzer internal parameters. ➢Call for a qualified technician to replace the backup memory battery ➢Download the analyzer internal parameters from a PC using the ISL UDS software supplied (refer to the section 4.4 page 4-75) or enter them (see chapter 4 page 4-74). ➢Then perform the calibration of the temperature measurement circuit and enter the sample temperature probe correction values (refer to the chapter 2 page 4-70).
5	“Signal conditioning (A/D Converter)”	No	A/D conversion fault	➢Switch off then switch on the analyzer to initialize the memory. ➢If the problem persists, call for a qualified technician.
6	“Cooling circuit”	Yes	Sample cooling rate < 65% during 120s	➢Check the cooling unit operation: using the Diagnostic mode (see section 1.2 page 4-68), control the cooling unit (80%) and check the sample temperature falls. ➢Perform a cooling compressor diagnostic (see section 1.3 page 4-69), print it and call for a qualified technician.
7	“Heating circuit”	No	Heating control > 50% and Cooling control < 10% and insufficient rising of T°samp	➢Check the cell heating resistor operation: using the Diagnostic mode (see section 1.2 page 4-68), control the heating (80%) and check the sample temperature rises. ➢Call for a qualified technician to verify the cell heating resistor and its supply circuit and to replace it if necessary.
8	“Sample temperature safety”	Yes	T°samp ≥ safety threshold+ or T°samp < safety threshold- (off-test)	➢Check the level of product in the vial is correct. ➢If yes, replace the O-ring seal of the sample loader lower arm. ➢Restart the test with a new sample well respecting the required quantity of sample. ➢Check the T°samp probe connection (connector J7 on the Acquisition Board; refer to the section 2.2.2 page 4-71). ➢If the problem persists, verify the limit settings in the alarm setup menu are compatible with the product tested. ➢Verify the temperature measurement by testing a known product and perform the calibration if needed (refer to the section 2.2 page 4-71).
9	“Overpressure measurement”	No	Pressure in the cell > 2300 Pa or Pressure in the cell < -2300 Pa	➢Check the pressure solenoid valve operation: using the Diagnostic mode (refer to the section 1.2 page 4-68), control the solenoid valve (press the key one time for one open / close cycle) and check the pressure in the cell varies. ➢Call for a qualified technician to check the solenoid valve connection and its power supply and to replace it if necessary.
10	“Out of cloud point measuring”	No	Optical emitter adjustment impossible	➢Restart the test with a new sample. ➢If the default persists: with a clear product, perform an automatic enslavement of the optical detector in diagnostic mode (refer to the section 1.2 page 4-68). ➢If the enslavement is not correct, call for a qualified technician to check the optical detector operation and replace it if necessary.

11	"Out of pour point measuring"	No	Pressure in the cell > 1850 Pa or Pressure in the cell < -1850 Pa (during test only)	➢Check the analyzer temperature range (-95°C to 45°C / -139°F to +113°F) is compatible with the product tested. ➢Restart the test with a new sample well respecting the required quantity of sample.
12	"Error in the programmed product"	No	Incoherence or checksum error in the test product	➢Check the test product parameters. ➢Turn off then turn on the analyzer to initialize the memory. ➢Restart the test with a new sample.
13	"Cooling unit temperature safety"	No	Failure signaled if cooling unit is above 48°C	➢Turn the analyzer off. ➢Clean the ventilation filters. ➢Turn the analyzer on again. ➢Check visually the cooling unit fan operation (see Picture 3 page 1-21). ➢In the contrary case or if the problem persists, call for a qualified technician.
14	"Cooling unit stroke control safety"	No		➢Contact ISL Customer Service.
15	"Cooling unit board link safety"	No	Failure signaled if no dialogue is detected with Cooling Control Board.	➢Turn off then turn on the analyzer. ➢If the failure persists, call for a qualified technician to check the Cooling Control Board connection to the Acquisition Board. ➢Turn the analyzer on again. ➢If the problem continues, contact ISL Customer Service.
16	"Check the changer and loader"	No	Detection of a blocking at the level with the changer or the loader	➢Unload the vial (refer to the section 2.6.1 page 2-37). ➢Restart the test with a new sample. ➢If the failure persists or if it is not possible to unload the vial, call for a qualified technician.
17	"Run down by a power down"	No	A power down has stopped a test series	➢If the analyzer has not been set to restart automatically and there is other samples in the loader, restart the loader manually (refer to the section 2.7 page 2-39). ➢Restart the test cancelled with a new sample.
18	"Leak detected, Check the sample"	No	The sample temperature decreases but the pressure change in the vial is insufficient	➢Check the level of product in the vial is correct. ➢Check the vial is not cracked or chipped. ➢Replace the sealing O-ring of the sample loader lower arm (refer to the section 5.3 page 4-78). ➢Restart the test with a new sample well respecting the required quantity of sample.
19	"Run stopped by the operator"	No		➢Restart the test with a new sample.

Table 19: List of alarms and actions to be undertaken

For alarm treatment and detailed description, refer to the chapter 6 - List of alarms and treatment page 3-53.
For alarm setup, refer to the section 7.3 page 3-59 of this manual.

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APPENDIX A - Printing type examples

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1 - Result ticket printout

1.1 - With details (with product parameters)

1.1.1 - Pour and cloud determination

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 **12/08/2004   14:03**  Op:
 Prod :37 DK302        ID:0001             (Start.Tmp: 25°C  Mode: standard)
 Pour:    -27.0°C    No-flow point:-27.4°C  (EP:    °C Test: 3.0°C)
 Cloud:    -8.0°C      Not rounded:-8.1°C   (EP:    °C Rounded: Yes)
```

1.1.2 - No-flow point determination only (test = 0) and non rounded cloud point

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 **12/08/2004   14:03**  Op:
 Prod :37 DK302        ID:0001             (Start.Tmp: 25°C  Mode: standard)
 No-flow point:-27.4°C                     (EP:    °C Test: 0.0°C)
 Not rounded:-8.1°C                        (EP:    °C Rounded: NON)
```

1.2 - Without details

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 **12/08/2004   14:03**  Op:
 Prod :37 DK302        ID:0001
 Pour:    -27.0°C    No-flow point:-27.4°C
 Cloud:    -8.0°C      Not rounded:-8.1°C
```

2 - Product parameter printout

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 Product: 37 DK302
  Mode: standard            Start.T:  25°C
  Pour Point  EP: -24.0°C   Tests: 3.0°C
  Cloud Point EP:  -8.0°C   Rounded:YES
```

3 - Operator name list printout

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 Operators list
  1:AM      6:
  2:LG      7:
  3:        8:
  4:        9:
  5:       10:
```

4 - Calibration ticket printout

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 Calibration ticket
 Sample Temp. measurement calibration
  Operator:                          Calibration reference:
  Calibration performed: 19/01/2004  Next calibration     : 19/01/2005
  -50°C/ -58°F:  80.310 ohms A/D: 35106  +50°C/+122°F: 119.400 ohms A/D: 52196
  Sample probe corr table:
 Laboratory name:
 Laboratory Manager name: HERVE          Title:
 Comments:
 Date:              Signature:
```

5 - Measure printout

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 Measures
  Smp Tmp:  25.5°C 109.94ohms A/D:48059
  Opt Rec:     8pts        Emt:    0pts
  Press. :    -8Pa
  Cooling:  0.0%   0 Heating:  0.0%   0
  C.Unit :00000011   Changer:01000001
```

6 - Internal parameter printout

```
**ISL MPP 5Gs**S/N: 225**V 1.5/ 1.5**  12/08/2004  13:41  ALAN:ISL MPP 5Gs
 Internal parameters
 General setup                          Access level:3    Auto edition:2
 Run setup                              Prod: 1 VGO          ReStart: Auto
 Alarms setup                           Buzzer modulation :  30 %
  Samp Tmp: t-:-125°C    t+:  65°C  10s  Cooling : t-: 65%Stp 120s
 Laboratory setup                       Laboratory name:
  Laboratory Manager name:              Title:
 Printer setup
  Results printing                      Auto: NO
  Printer:Epson ESC/P compatible        Degree:248 Line feeds: 2 lines
 RS232 setup
  Transmitted data with the result      Conditions of run: YES Product: YES
  On line  :   YES  Analyzer ID :   1   Automatic result validation   :  NO
  Rate     : 19200  Data bits   :   8   Stop bits:     1  Parity      : None
  End of transmission character :   0   Flow control :   None
  Time between two messages             if no flow control used : 0.1s
 PC link setup                          Analyzer PC ID: ISL MPP 5G
  On line  :    NO  Address     :   0
 Date/Time Setup
  Date format: DD-MM-YYYY               Time format: 24 hours
 Regulation parameters
  Kp1: 5.0 Ki1: 0.20                    Kp2: 8.0 Ki2: 0.15
  Kp4:15.0 Ki4: 0.40                    Km :10.0
 Sample Temp. measurement calibration   Next calibration date: 19/01/2005
  Calibration frequency: 365 days       Start test refusal:  NO
  -50°C/ -58°F:  80.310 ohms A/D: 35106 +50°C/+122°F: 119.400 ohms A/D: 52196
 Sample probe corr table:
  -100°C:  0.0         -90°C:  0.0        -80°C:  0.0         -70°C:  0.0
   -60°C:  0.0         -50°C:  0.0        -40°C:  0.0         -30°C:  0.0
   -20°C:  0.0         -10°C:  0.0          0°C:  0.0          10°C:  0.0
    20°C:  0.0          30°C:  0.0         40°C:  0.0          50°C:  0.0
    60°C:  0.0          70°C:  0.0         80°C:  0.0          90°C:  0.0
 Detection parameters (Standard Mode)
  Lmin:3000 Ls:200 Lconf:0.20 Cofs: 2.0
  Psb :20  Psh: 75 Pconf:3000           Pdf:0.25  Ppa:0.50 Pofs: 0.4
 Detection parameters (Slow Mode)
  Lmin:3000 Ls:300 Lconf:0.20 Cofs: 2.0
  Psb :20  Psh: 70 Pconf:3000           Pdf:0.25  Ppa:0.50 Pofs: 0.4
 Loader position         Up:5    Down:12
 ISL  400/DFFF   -1/FFFF   1.4/ 3CE       1.4/95BE   0/ 0  13/02/2003   510
 Cooling unit parameters
 S/N :M100B4/N°435  29/08/2003          Runs:   792        23/01/2000
     851:48       140:40         60:00        73:28         9:33          2:29
       0:00         0:00          0:00
 29/08/2003  10     0       100 %
   17    1min16   217
    0    2min04   218
   -9    2min34   218
  -17    3min01   219
  -34    4min09   221
  -51    5min30   223
  -68    7min11   223
  -87    9min46   223
 -100   12min15   225
 -110   15min07   220
 21/01/2000                100 %
   17    1min40   219
    0    2min41   220
   -9    3min18   221
  -17    3min55   222
  -34    5min24   224
  -51    7min19   227
  -68    9min53   227
  -87   14min32   225
 -100   21min29   218
 -110   33min05   215
```

APPENDIX B - RS232 link features on MPP 5Gs

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In this document, ***analyzer*** is used for the ISL MPP 5Gs while ***host computer*** designates the computer to which the ISL MPP 5Gs is connected.

1 - Interface features

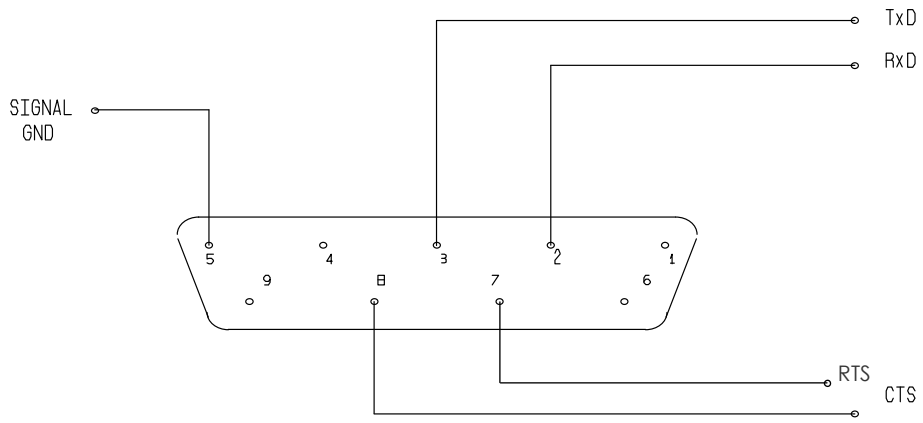
EIA-RS 232C serial link

Rate : 300 to 19200 BPS
Data bits : 7, 8
Stop bits : 1, 2
Parity : none, odd, even

Switchable on-line / off-line state
Pre-defined message transmission available for test.
Possibility to define an identifier (number) for the analyzer.
Possibility to activate result auto-validation.
Automatic detection of the RS232 interface cable adapter.

2 - Outlet connector broaching

The RS 232C connector of the adapter is a 9-pin connector. The pin configuration is as shown below.



EIA RS 232C interface

Line status in standby: +12 V (MARK),
Input signals used: CTS / RTS.

3 - Communication protocols

Flow control / Protocol can be :
- None
- RTS/CTS
- Xon/Xoff
- ENQ/ACK

Flow control	Type	Comments	
None		Transmitted messages are sent **without any way to stop them** from the host computer. However, a special parameter ("Time between two messages") in the ISL analyzers allows to define a pause between to successive message from 0.0 s to 10.0 s (by step of 0.1 s) *Note : This time is applied between 2 entire messages (not between characters)*	
RTS / CTS	Hardware	Existing signals defined in the RS232C interface standard are used to control the transmission. Connect the host computer serial RTS signal to the analyzer CTS signal. When the input buffer of the host computer is full, the RTS signal changes its state. Seeing its CTS signal changing, the analyzer stops transmission until CTS changes again. *Note: This hardware handshake is controlled by the communication hardware analyzers and can stop / restart transmission between any characters*	
Xon / Xoff	Software	This well-known handshake is qualified as "software protocol" because it is **controlled by the host computer reception software to control the data flow**. If the software needs time to process the last incoming message, it can send the Xoff character to the analyzer which immediately stops the transmission, until it receives from the host computer the Xon character.	Xon = 11H Xoff = 13H
ENQ / ACK	Software	This is a full protocol. It allows **flow control and data acknowledgment**. The transmission is fully controlled by the host computer, which must send an ENQ (enquiry) character. Any message must be acknowledged by the host computer by sending a ACK character. *Note: There is no need to define a time between messages because the message sequencing keeps pace with the ENQs sent by the host computer.*	Developed by ISL this protocol is detailed below.

4 - ENQ / ACK protocol details

The host computer must acknowledge all messages from the analyzer.
Should communication fail, only the host computer can decide whether or not to abort transmission.

Analyzer response time on receiving ENQ:	< 100 ms
Waiting time for message acknowledgment:	2 sec
Results transfer delay after end of test (delay for ENQ) :	not limited
Number of transmission of the same result message on receiving NAK:	not limited (end with ACK or EOT reception)

Request, reception and acknowledgement of results

The host computer uses the ENQ code (05H) to ask the analyzer if any results are ready to be sent.
If the analyzer has no results to send, it replies ACK (06H). The host computer does not have to reply to this ACK.

	ANALYZER		HOST COMPUTER
No result available		←	**ENQ**
No result	**ACK**	→	

If the analyzer has results, it starts their transmission.
On receiving the message, the host computer must check it (checksum) and must reply ACK (06H) or NAK (15H), depending on whether the message was correct or not.
If there are several fruitless communications, the host computer may decide to abort transmission by sending an EOT (04H) character.

	ANALYZER		HOST COMPUTER
Successfull transmissions		←	**ENQ**
1 result message	**XXXXX**	→	
		←	**ACK**
		←	**ENQ**
Next result	**YYYYY**	→	
		←	**ACK**
		←	**ENQ**
No more result	**ACK**	→	

	ANALYZER		HOST COMPUTER
Result sent, faulty reception		←	**ENQ**
1 result message	**XXXXX**	→	(not properly received)
		←	**NAK**
		←	**ENQ**
Same message	**XXXXXX**	→	(not properly received)
		←	**NAK**
		←	**ENQ**
Same message	**XXXXXX**	→	(not properly received)
Host ends the communication		←	**EOT** Abort

5 - Transmitted data

Example:

```
( 1,"R ","DK302       ","0001        ",37, 0, 1, -27.0, -27.4, 1,  -8.0,  -8.0,   0)D3
( 1,"C ","AM          ","26/03/2004", 4,"14:03 ",999)FB
( 1,"T ","DK302       ", 0,  0, 1, -24.0, 3.0, 1,  -8.0, 1,00)D2
```

The data that can be transmitted are divided in 3 groups:

Group	Contents	Transmitted...
Result	See messages R below	Always
Run context	See messages C below	If defined in the RS232 link setup
Test product	See message T below	If defined in the RS232 link setup

To be transmitted, a result must be validated:

- Manual validation must be performed at the analyzer level (refer to the section 4.1 page 3-48,). The transmission is only possible after the validation.
- Automatic validation can be set in the RS232 link setup (refer to the section 7.6.1 page 3-60, screen 2 of the ***RS 232*** menu.

5.1 - Message format

Messages are in ASCII code.
Character strings are enclosed within **“ “** (double quotes).
They start with an opening bracket **(**
They finish witha closing bracket **)** , 2 characters **CK** , and the characters : **CR, LF** and **EOT**

- CK (2 characters) = checksum = the 2 least significant digits (expressed in ASCII) of the result of the hexadecimal sum of all the preceding characters, including the brackets.
- CR (1 non printable character) = Carriage Return = 0Dh
- LF (1 non printable character) = Line Feed = 0Ah
- EOT (1 non printable character) = End Of Transmission character, programmable in the RS232 setup menu (If = 0 , there is no end of transmission character).

☞ ***The value 999 indicates that the field is not being used (reserved for a future use).***

5.2 - The result message

As indicated above, if the transmission of data on the RS 232C link has been validated (automatic or manual validation), the result message is systematically transmitted.

Temperatures expressed in °C or °F, corrected or not by barometric correction, depending on the product programmed.

Example:

```
( 1,"R ","DK302       ","0001        ",37, 0, 1, -27.0, -27.4, 1,  -8.0,  -8.0,   0)D3
```

Meaning of result message fields (under ticket form) from left to right

Message R

Fields	Format	Number of Characters	Field value
Analyzer number	From 00 to 99	2	
Type of message	String	2	" R " = Result
Product name	String	12	
ID - sample	String	12	
Sample number	String	12	
Product number	From 00 to 99	2	
Temperature unit used	00 to 01	2	0 = °C, 1 = °F
Type of end of test in pour	From 00 to 05	2	
Pour point according to the product configuration	From -999.9 to 9999.9	6	
Blocking point according to the product tmp unit	From -999.9 to 9999.9	6	
Type of end of test in cloud	From 00 to 05	2	
Cloud point according to the product configuration	From -999.9 to 9999.9	6	
No rounded cloud point and tmp unit of the product	From -999.9 to 9999.9	6	
Alarms during the test coded by bit	FFFF	4	

Type of end of test in cloud	
01	Normal cloud result
02	Not programmed
03	Temperature measurement safety
04	Out of measurement capacity of the optical detector
Type of end of test in pour	
01	Normal pour result
02	Not programmed
03	Temperature measurement safety
04	Out of measurement capacity of the sensor
Alarms during the test coded on 1 bit : 3210	
0	= 1: Automatic adjustment of the temperature have to be done
1	=1: Resumption after detection in rapid stage
2	= 0
3	= 0

5.3 - The run context message

Example:

```
( 1,"C ","AM          ","26/03/2004", 4,"14:03 ",999)FB
```

Meaning of run context message fields (under curve form) from left to right

Message C

Field	Format	Numbers of Characters	Comments
Analyzer number	From 00 to 99	2	
Type of message	String	2	" C "= Test context
Operator name	String	12	
Date of the end of test	String	10	
Date format	From 00 to 07	2	0 : JJ-MM-AA 1 : MM-JJ-AA 2 : AA-MM-JJ 3 : AA-JJ-MM 4 :JJ-MM-AAAA 5 : MM-JJ-AAAA 6 : AAAA-MM-JJ 7 : AAAA-JJ-MM
Time of the end of test	string	6	
Reserve	999	3	

5.4 - The test product message

Example:

```
( 1,"T ","DK302       ", 0,  0, 1, -24.0, 3.0, 1,  -8.0, 1, 0)D2
```

Meaning of product message fields from left to right

Message T

Field	Format	Numbers of Characters	Comments
Analyzer number	From 00 to 99	2	
Type of message	String	2	" T " = Test product
Product name	String	12	
Temperature unit	00 or 01	2	0 = °C 1 = °F
Preheating temperature in 0,1°C	999	3	
Type of analysis in pour	00 or 01	2	0=No; 1=detection
Expected temperature in pour	-999.9	6	999.9 if not keyboarded
Frequency of tests	99.9	4	
Type of analysis in cloud	00 or 01	3	0=No; 1=detection
Expected temperature in cloud	-999.9	6	999.9 if not keyboarded
Cloud result rounded	00 or 01	2	0=No; 1=Yes
Mode	00 or 01	2	0=Standard, 1=Slow

5.5 - RS232 link test message

(ISL MPP 5G) E2

6 - RS232 cost

There is neither option, nor extra fee for RS232 software and hardware (including the RS485 / RS232 cable adapter). They are provided as standard.

APPENDIX C - Sequence charts

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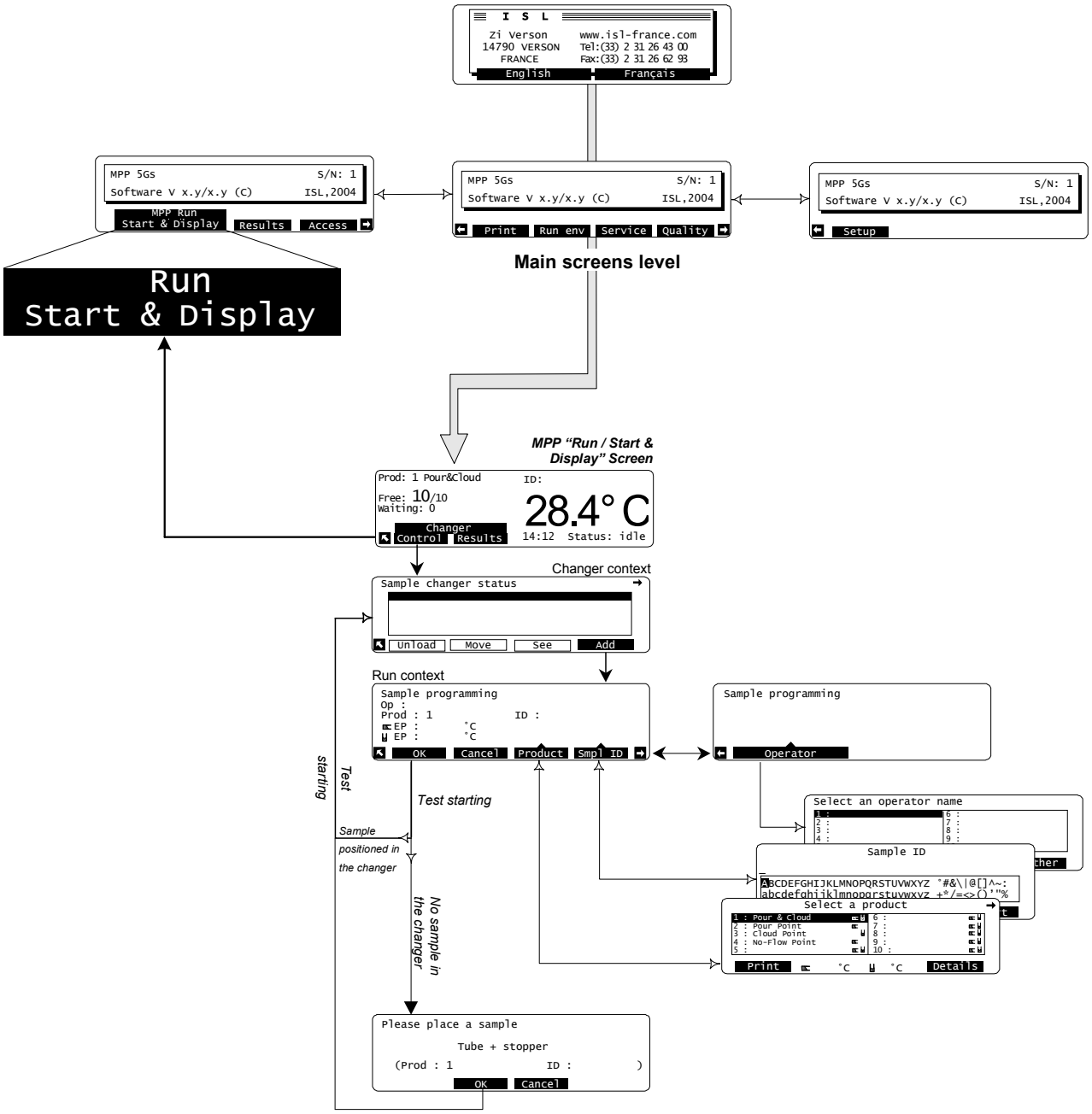
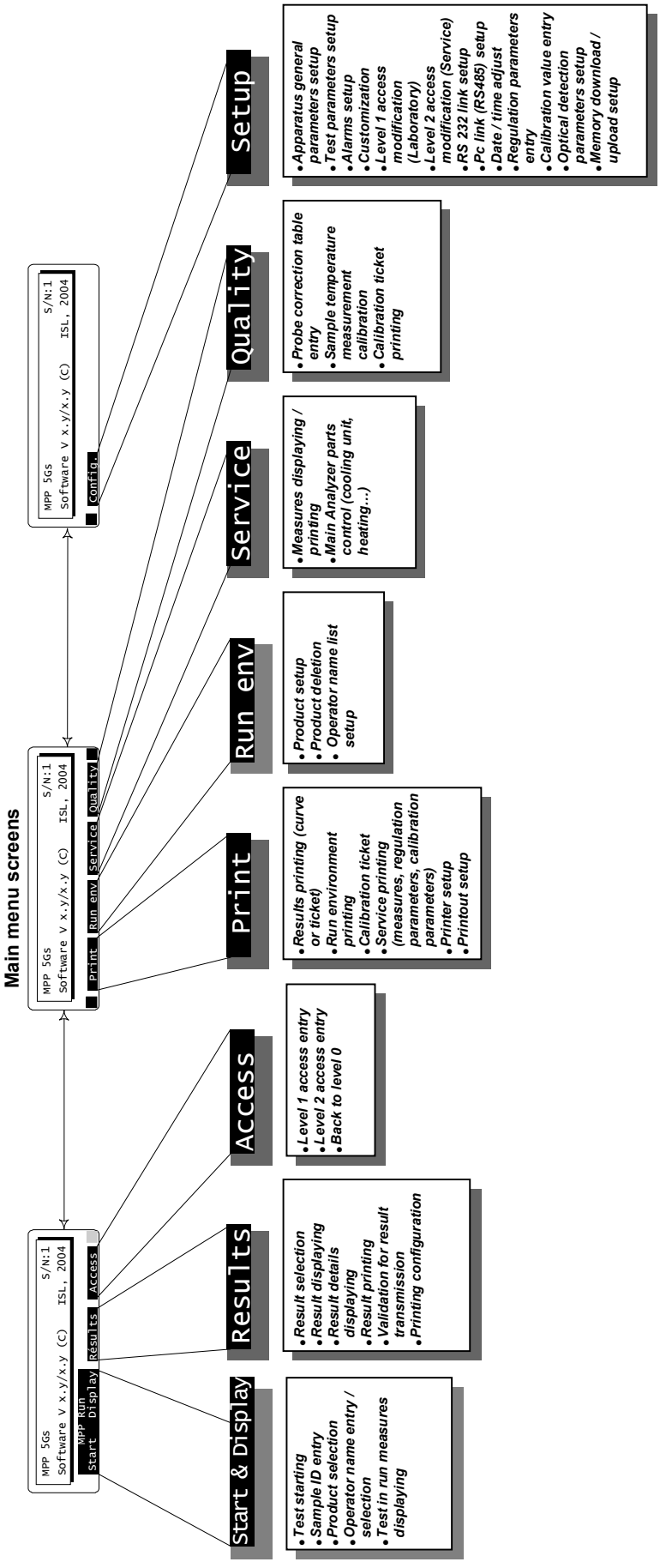
1 - Test launch diagram



2 - Action chart



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